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OBSERVATIONS ON THE ANATOMY OF THE ISCHIO-RECTAL FOSSA.

By W. JOHN CLOSE,

From the Department of Anatomy, University of Adelaide.

Introduction.

IN an attempt to understand the anatomy of the pelvis, perhaps the most variable part of the human body, during the years 1929 to 1933 the writer dissected four European female pelves, one aboriginal female pelvis and one aboriginal male pelvis. In addition, numerous others were investigated in conjunction with the students of the University of Adelaide during their dissections. These amounted to fifteen male and three females pelves.

Cross-sections were also made of one male pelvis in a coronal plane, at right angles to the pelvic floor, and of another male pelvis in a transversely horizontal plane.

Finally, comparative studies were undertaken and dissections were made of a number of animals, three of which will later be referred to. All locally available literature on the subject, English, French and German, historical and modern, has been read.

One subject, a female aboriginal, aged thirty years, showed such a small amount of fibrous tissue of a cicatricial nature in the perineum that the isolation of various planes became an easy matter. More defined structures than usually met with were also displayed, so that these were naturally compared with those found in the usual elderly subjects of the dissecting room. The variations in perfection to be found in them, up to the excellent definition in the female aboriginal, led the writer to accept

this pelvis as a standard; and frequent reference to it will indicate appreciation of its perfection rather than of its average normality.

At least one deficiency in the research undertaken is recognized by the author, namely, the absence of any coronal sections of female pelvis made at right angles to the pelvic outlet. This was due to the fact that females are comparatively rare in the dissecting room; and up to date it has not been possible to spare one for the purpose. Strangely enough, in the literature accessible in Adelaide, no portrayal,

it tends to become more hemispherical or dome-shaped. The base is open to the fibro-fatty tissue of the buttock. It is bounded laterally by the sacro-tuberous (greater sciatic) ligament and edge of the *gluteus maximus* muscle and by the *tuber ischii*. Anteriorly it is bounded by the muscles of the urogenital diaphragm and by the confusion of fibrous structures which in the male is collectively referred to as the triangular ligament. Medially it is bounded by the *sphincter ani externus* and coccygeal body.

Sphincter ani externus
Ischium
Anterior septum
Lamina terminalis { Middle septum
Lateral edge
Posterior septum
Gluteal aponeurosis
Musculus gluteus maximus
Ano-coccygeal body (cut)
Fourth sacral nerves



FIGURE I.

Dissection of a female Australian aboriginal pelvis, showing the ischio-rectal fossa of the right side. The anus and labia are pulled over to the opposite side. The *lamina terminalis* and its three coronally placed septa are separated from fat.

either diagrammatic or photographic, could be found, even in the many controversial articles on the respective values of the visceral supports. It is hoped that this deficiency can be remedied later.

General Description of the Ischio-Rectal Fossa.

The ischio-rectal fossa is usually pyramidal in shape, though in some pelvis, as will be seen later,

The posterior and lateral walls are the coccygeus muscle or sacro-spinous (lesser sciatic) ligament and the lunate fascia. The anterior wall is a vertical septum of the *lamina terminalis*. The medial walls are pubo-coccygeus and ilio-coccygeus (divisions of the *levator ani* muscle), covered by the epimysial anal fascia or inferior fascia of the pelvic diaphragm (B.N.A.), as well as the *sphincter ani externus*.

In Figure V the muscular and aponeurotic structures mentioned are shown, except the *lamina terminalis*. This bounds the fossa anteriorly and forms a lining more or less atrophic to the stronger tissues. A more detailed account of the *lamina terminalis* and *fascia lunata* will be given later.

No diverticula occur either forwards or backwards from this circumscribed area, as anatomy text-books frequently assert, so that pus is prevented from extending in these directions. One diverticulum described as extending forwards between the *transversus peronei profundus* and the *levator ani* is completely obviated by the *lamina terminalis* (the only constant process of this lamina); and that said to protrude backwards between the sacro-tuberous and sacro-spinous ligaments is prevented by the aponeurotic *fascia lunata* which fills in this gap. Even extension under the *gluteus maximus* is prevented by the *lamina terminalis*.

If the obturator fascia is missed in this description, it should be explained that the *fascia lunata*, which has nothing to do developmentally with the *obturator internus*, has taken its place. Underlying this fascia a fine epimysium belonging to the obturator muscle can usually be found.

The Lamina Terminalis Fossa Ischio-rectalis.

The *lamina terminalis* *fossa ischio-rectalis* (Figure I and Figure II) was described by Elliot Smith⁽¹⁾ in the following words:

The upper edge of the *fascia lunata* is joined to the inner surface of the anal fascia by means of a delicate band of fibrous tissue . . . At the base of the triangular ligament the attachment of this limiting membrane leaves the upper margin and passes vertically downwards across the base of the lunate fascia just behind the artery to the bulb, the base of the triangular ligament, and the superficial transverse perineal muscle. It is attached to the surface of the *erector penis* muscle which extends into the outer wall of the ischio-rectal fossa. . . This roof membrane of the ischio-rectal fossa separates this latter space from a narrow cleft between the *levator ani* muscle and the *obturator internus* . . . the supra-tegmental space.

One is led to the assumption that this space is then open to the potential space reaching as far as the pelvic brim, as if no adhesion takes place between the anal and the lunate fasciae above. I personally doubt whether such a fusion is ever wanting; and indeed, Derry's original description of the lunate fascia distinctly includes it, as will be seen later.

My dissections show me that the vertical portion of this lamina, limiting the fossa anteriorly, is the only constantly demonstrable part. The "transverse delicate band of fibrous tissue" shutting off the supra-tegmental space is by no means constant.

In the female aboriginal pelvis, on the other hand, that of a much younger subject than is usually encountered in the dissecting room, a much more extensive and well-defined membrane was found (Figure I). It afforded an almost complete lining to the ischio-rectal fossa, medially merging with the fatty perimysium of the external anal sphincter and ano-coccygeal body, leaving these to pass upwards and laterally over the inferior diaphragmatic (anal) fascia and *fascia lunata*, then passing out of the fossa into the fibro-fatty subcutaneous tissue of the buttock.

Anteriorly it was reflected downward, with a slight backward inclination to limit the fossa, as shown by Smith. Here, at its inferior edge, it became fused with the superficial perineal fascia of the urogenital triangle. Posteriorly it passed downward over the edge of the *gluteus maximus* muscle.

Two septa composed of this membrane were raised in the fossa by vessels and nerves passing across it; so that, including the partition between fossa and urogenital triangle, three septa of the membrane may be described. The first was an anterior septum, limiting the

fossa anteriorly, composed of two layers inseparable by dissection, namely, the *lamina terminalis* on the fossa side and the superficial perineal fascia on the urogenital side. From near the base the bulbar artery and nerve referred to by Smith could be dissected out. The second was a middle septum containing the superficial perineal nerve in its sharp inferior edge, with the transverse perineal artery, a branch of the perineal, lying at a deeper level. The third was a posterior septum, containing the inferior hæmorrhoidal vessels in its free margin, and the nerves at a deeper level.

The fat was easily shelled out with the handle of the scalpel, these septa being left intact. The membrane was then seen to be anything but tightly stretched where it was in contact with the medial and lateral walls or apex of the fossa. It presented rather a billowy appearance, which was accentuated when air was blown underneath it.

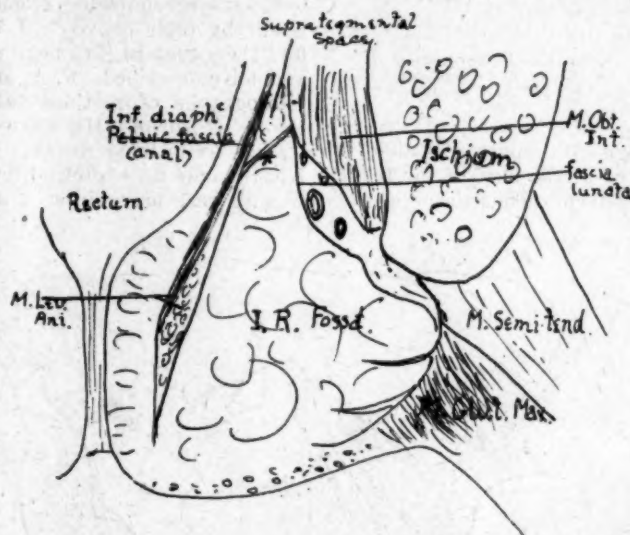


FIGURE II.

Drawing of a section of a Sudanese negro (after Elliot Smith). * *Lamina terminalis*, the transverse delicate band of fibrous tissue described by Smith as passing between anal and lunate fascia, so as to shut off a supra-tegmental space from the ischio-rectal fossa.

At these points it was easily dissected up. A line of attachment to the vault from front to back was found at the upper concave edge of the fascia

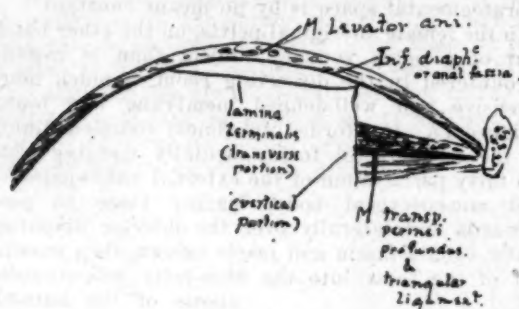


FIGURE III.

My own diagram to illustrate Elliot Smith's conception of the lamina terminalis. A sagittal section is represented as passing through the fossa, medial to the junction between anal and lunate fasciae.

lunata. Here the supratsegmental space was divided into a lateral space, limited at the base of the fossa rather indefinitely by the subcutaneous tissue of the

to correspond with the supratsegmental space described by Elliot Smith.

Anteriorly the limiting membrane was firmly fused with the various structures that met at the base of the urogenital diaphragm, and not one of the septa could be separated into two definite layers, except at their bases.

In a male aboriginal pelvis, which was fairly typical of all the others, both male and female, fibrous tissue predominated in the fossa; but the septa, when looked for, could be recognized. They were infiltrated with fat, and very adherent to the gluteal aponeurosis, fascia *lunata*, inferior diaphragmatic fascia and *sphincter ani externus*. The supratsegmental space in this and the other pelvises was entirely wanting. The septa were ill defined, but were recognizable from the remaining fibrous tissue by their density. I believe it is possible to find them even in European pelvises as well developed as I have described. F. A. Maguire's figures include photographs of sections taken at right angles to the pelvic brim. His Plate V⁽²⁾ shows the lamina terminalis in most respects as I have found it, and I have made my sketch (Figure IV) from this plate to illustrate my points.

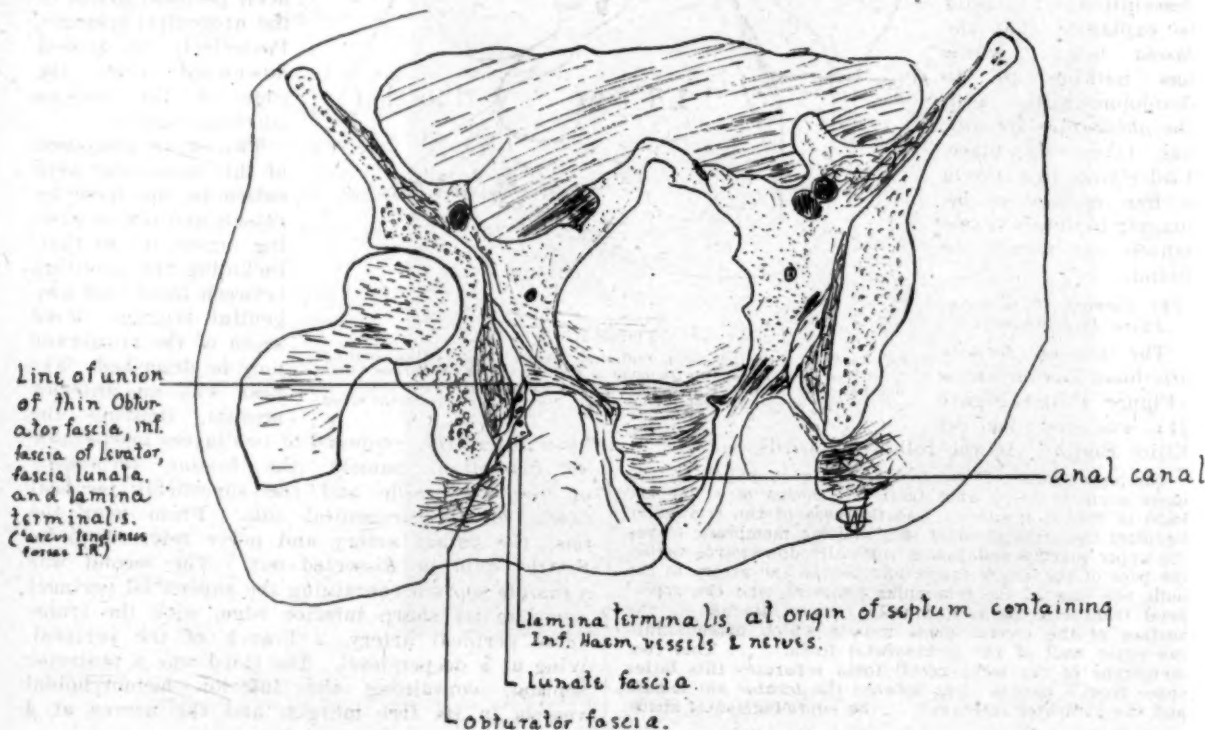


FIGURE IV.

Drawn from a photograph of F. A. Maguire's section at right angles to the pelvic brim, showing the lamina terminalis and other structures in the ischio-rectal fossa as I have described them.

buttock, and a medial space below the shelter of the inferior diaphragmatic fascia, and limited infero-medially by fusion of the lamina with the external sphincter. The medial space would appear

A certain number of muscle fibres may sometimes be found proceeding outwards in the posterior septum from the *sphincter ani*. In most cases there is a poverty of these fibres; but if they are plentiful

the paucier perineal muscle of Paul Delbet,⁽³⁾ described as passing from the sphincter to the *tuber ischii*, would be accounted for. The same origin again is suggested to me for the ischio-anal muscle of the horse. In this animal the pubo-coccygei and ilio-coccygei are completely lacking, and the ischio-anal muscle takes their place in supporting the anal canal.

Maguire,⁽²⁾ referring to the delicate transverse process of Elliot Smith, suggested that the *lamina terminalis* afforded a lateral support to the rectum. Certainly the presence of such muscle fibres would ensure it, though unfortunately they are too often atrophic.

The origin of the lamina in question seems obvious to me from the dissection of the female aboriginal; it is the deep membranous portion of the subcutaneous fascia, which has been pushed in by the more superficial fatty layer in the development of the fossa. It is therefore of the same nature as the abdominal fascia of Scarpa and the superficial perineal fascia of Colles. If there were such a layer in the subcutaneous fatty tissue of the buttock, the lamina might be seen to pass directly into this; but just as this layer has disappeared in the buttock, so it also may be lacking in the ischio-rectal fossa.

The Fascia Lunata.

Derry's description⁽⁵⁾ of the *fascia lunata* reads as follows:

The *fascia lunata* is actually that part of the obturator fascia which forms the outer wall of the ischio-rectal fossa, and encloses the pudic vessels and nerve in a sheath usually known as Alcock's canal. It has very definite attachments forming a great arcuate band, the extremities of which are the ischial spine posteriorly, and the lower border of the symphysis pubis anteriorly, while its lower edge is continuous with the falciform process of the great sacro-sciatic ligament. Further forward on the pubic arch it comes in contact with the triangular ligament. It thus bridges over the gap between the great sciatic ligament and the spine of the ischium, and the pudic vessels and nerve, returning through this arch to become enclosed in its substance. If traced beyond the spine it is seen to become continuous with the sheath of the coccygeus muscle. Its thick upper margin is continuous with the delicate sheath of the obturator internus muscle, and at this same spot the levator ani in its passage towards the rectum gets attachment to it through its own sheath, thus forming the apex of the ischio-rectal fossa.

My dissections furthermore convince me that the *fascia lunata* is the forward extending aponeurosis of the ischio-coccygeus (coccygeus) muscle. My reasons for this assumption are as follows.

1. In dissections of the human subject many muscle fibres of the coccygeus are seen, which, from their direction, evince no attempt to reach the ischial spine, but pass forwards into the *fascia lunata*, with whose fibres they appear to be continuous. (See Derry's reference above to the fusion of the fascia with the sheath of the coccygeus.) Figures V and VI depict this continuity of fibres.

2. In plantigrade animals the three muscles of the pelvic floor (pubo-coccygeus, ilio-coccygeus and

ischio-coccygeus) have assumed different functions from those maintained in the pronogrades. The pubo-coccygeus, by virtue of its sling-like function in man, is the least degenerated; the ilio-coccygeus is

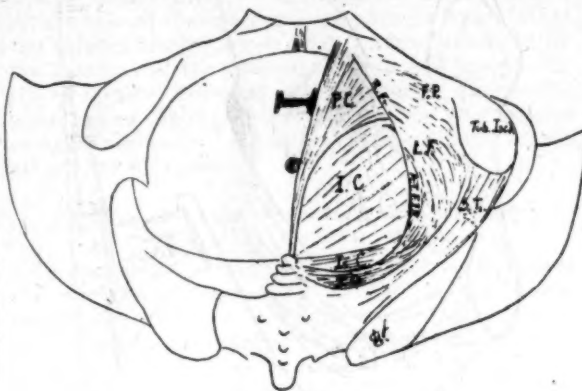


FIGURE V.

Diagram of female Australian aboriginal pelvis, showing relations of *fascia lunata*. S.T.: sacro-tuberosus ligament; S.Sp.: sacro-spinous ligament; Is.C.: ischio-coccygeus; P.C.: pubo-coccygeus; I.C.: ilio-coccygeus; F.L.: *fascia lunata*; F.P.: falciform process of S.T.; Tr.L.: transverse ligament of pelvis; R.F.: fibrous union referred to in text; A.T.F.I.R.: arcus tendineus fossae ischio-rectalis; C.Cav.: impression for corpus cavernosum.

Note: Is.C. (ischio-coccygeus), P.C. (pubo-coccygeus) and I.C. (ilio-coccygeus) are covered by anal or inferior diaphragmatic fascia.

nearly, but not entirely, transformed into an aponeurosis covering the *obturator internus* above the pelvic diaphragm, and the ischio-coccygeus, repre-

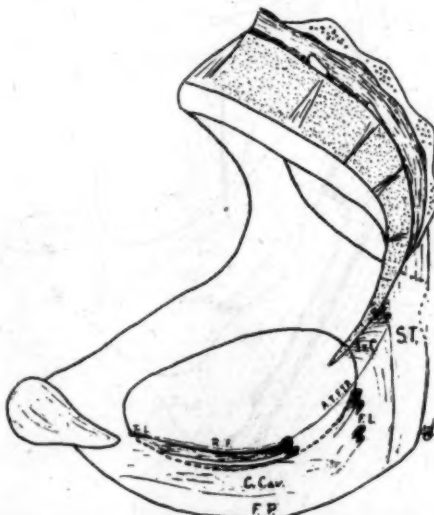


FIGURE VI.

Dissection of male Australian aboriginal, showing relation of lunata fascia from an infero-medio-posterior aspect. Typical of most pelvis.

sented by the coccygeus muscle, may be entirely fibrous. The disappearance of the tail has rendered the latter two unnecessary.

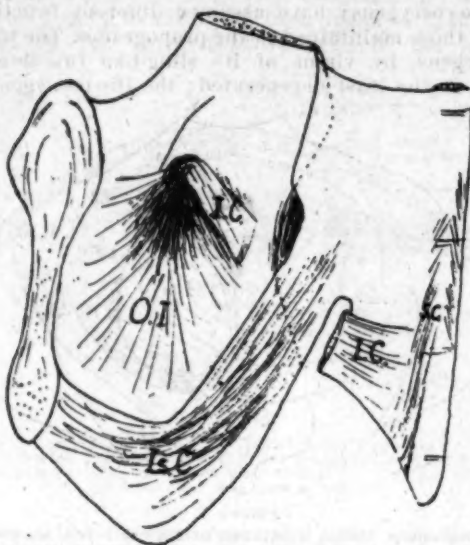


FIGURE VII.

Dissection of a sheep, *Ovis aries (africana)*.
 L.T.: linea terminalis (pelvic brim); Is.C.:
 ischio-coccygeus; P.C.: pubo-coccygeus; I.C.:
 ischio-coccygeus; S.C.: sacro-coccygeus anterior;
 Pyr.: pyriformis; Sac. Tub.: muscle representing
 the sacro-tuberous ligament of man; G.: glutei;
 G.I.: gemellus inferior; G.S.: gemellus superior;
 O.I.: obturator internus; B.C.: bulbocaver-
 nosus; P.V. and P.N.: pudendal vessels and
 nerve; Ob.N.: obturator nerve; Sc.N.: sciatic
 nerve.

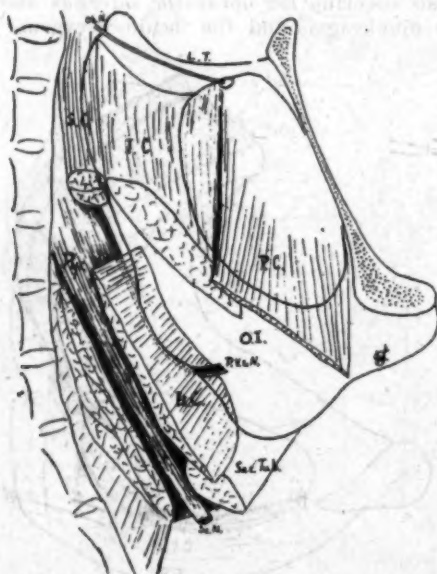


FIGURE VIII.

Dissection of a kangaroo doe, *Macropus giganteus*.
 L.T.: linea terminalis (pelvic brim); Is.C.:
 ischio-coccygeus; P.C.: pubo-coccygeus; I.C.:
 ischio-coccygeus; S.C.: sacro-coccygeus anterior;
 Pyr.: pyriformis; Sac. Tub.: muscle representing
 the sacro-tuberous ligament of man; G.: glutei;
 G.I.: gemellus inferior; G.S.: gemellus superior;
 O.I.: obturator internus; B.C.: bulbocaver-
 nosus; P.V. and P.N.: pudendal vessels and
 nerve; Ob.N.: obturator nerve; Sc.N.: sciatic
 nerve.

3. My studies in the comparative anatomy of the part have shown me that the ischio-coccygeus is frequently of much more importance than the coccygeus muscle in man and in the carnivora.

The ungulates and some of the rodents in particular demonstrate this, as Paramore⁽⁶⁾ has pointed out. One of the ungulates, the merino sheep (Figure VII), demonstrates the muscle just as we should expect to find it in man if the lunatic fascia were mostly composed of muscle tissue.

The dissection of the kangaroo doe (Figure VIII) is depicted to show the protection afforded to the pudendal vessels and nerve; and that of the male baboon (Figure IX) is depicted because it was the particular primate referred to by Derry, although the ischio-coccygeus was not considered in his description.

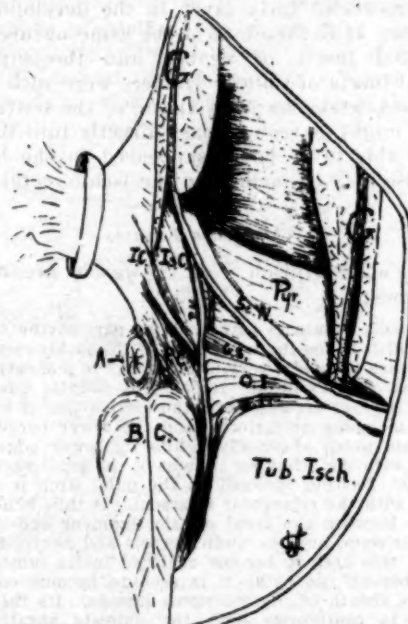


FIGURE IX.

Dissection of a baboon, *Charopithecus rhodesia*.
 L.T.: linea terminalis (pelvic brim); Is.C.:
 ischio-coccygeus; P.C.: pubo-coccygeus; I.C.:
 ischio-coccygeus; S.C.: sacro-coccygeus anterior;
 Pyr.: pyriformis; Sac. Tub.: muscle representing
 the sacro-tuberous ligament of man; G.: glutei;
 G.I.: gemellus inferior; G.S.: gemellus superior;
 O.I.: obturator internus; B.C.: bulbocaver-
 nosus; P.V. and P.N.: pudendal vessels and
 nerve; Ob.N.: obturator nerve; Sc.N.: sciatic
 nerve.

The sheep (Figure VII) has no pubo-coccygeus; the ilio-coccygeus is a vestigial strap of muscle passing from the upper edge of the obturator foramen to the tail, whereas the ischio-coccygeus is very well developed. It originates from the pubis as far forwards as the symphysis; more muscle and tendinous tissue arise all along the ischium to a point beyond the spine and end in a broad apo-

neurosis which fills in the interval between pelvic bones and tail. The concavity of this boomerang-shaped muscle is muscular, and blends with the covering of the *obturator internus* muscle, as does the *fascia lunata* in human subjects; whilst the lower, convex part is strongly tendinous, attached to the ischial ramus, and resembling the falciform process of the sacro-tuberous (great sciatic) ligament (of which more will be said later). The shape, course and general direction of this muscle's fibres should be compared with the drawing of the lunate fascia in Figure VI.

In the kangaroo is seen the long origin of the ischio-coccygeus from the ischium, up to and including part of the tuberosity, covering the pudendal vessels and nerves for some distance, until perforated by them in their passage medially towards the urogenital sinus. The pubo-coccygeus and ileo-coccygeus are still, however, the relatively strong muscles in this species.

In the baboon, although all three muscles are present, is seen a much thicker and stronger ischio-coccygeus than the ileo-coccygeus or pubo-coccygeus. In my drawing the tail is retracted to the left to demonstrate the right side of the perineum. The ischio-coccygeus has an anterior attachment to the ischial spine, but some of its fibres are traceable forward into a sagittally placed lamina of fibrous tissue which carries the pudendal vessels and nerves.

I am now going a step further by drawing attention to the continuity of the texture of the falciform process of the sacro-tuberous ligament and that of the lunate fascia. This leads me to believe that they are both derived from the same muscle, the vertical extent of the falciform process being limited by its arrival at the so-called Alcock's canal. The thinned-out superior portion, which is contributing to the tunic of the vessels and nerves, is the lunate fascia.

From what I have said it seems reasonable to regard the infradiaphragmatic obturator fascia, that is, the lunate fascia, as the aponeurosis of the ischio-coccygeus, just as, following Sir Peter Thompson, we now regard the supradiaphragmatic obturator fascia as the aponeurosis of the ilio-coccygeus.

To sum up, then, the lunate fascia is a strong fascial structure, the aponeurosis of the ischio-coccygeus muscle, roughly semilunar in shape, extending from this muscle's remnants, the coccygeus muscle, or sacro-spinous ligament (identical structures¹) posteriorly, to the inferior ramus of the pubis anteriorly. Along its convex edge it includes the so-called falciform process of the sacro-tuberous ligament, and is attached to the antero-medial edge of the sacro-tuberous ligament as well as to the inferior margin of the pelvic bones. It

¹ The sacro-spinous (lesser sciatic) ligament exists only in so far as more or less of the muscle fibres of the coccygeus have been converted into fibrous tissue, and indeed frequently replaces this muscle altogether. The sacro-tuberous (great sciatic) ligament is also probably a fibrosed muscle, represented in the drawing of the kangaroo as the sacro-tuberous muscle.

bridges over the space between the sacro-tuberous and sacro-spinous ligaments. Its concave edge is attached posteriorly to the sacro-spinous ligament, and then, at a varying depth along its anterior course, to the inferior diaphragmatic (anal) fascia. At the base of the urogenital diaphragm it reinforces the various fascial layers, and is here perforated by the branches of the pudendal vessels and nerves. In the urogenital triangle, whilst covering the ischio-pubic rami, it gives attachment to the *corpus cavernosum* and to the different components of the urogenital diaphragm.

The Arcus Tendineus Fossæ Ischio-rectalis (White Line of the Ischio-Rectal Fossa).

In the female aboriginal pelvis referred to above, the slightly concave edge of the lunate fascia indicated a white line on the inferior diaphragmatic fascia, several millimetres in width, extending from the neighbourhood of the ischial spine to the base of the urogenital diaphragm. It was the line of

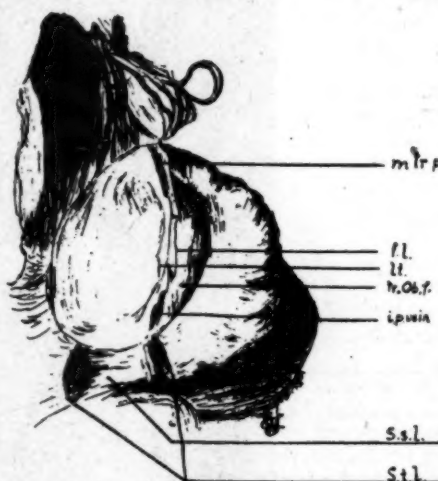


FIGURE X.

A further dissection of the pelvis illustrated in Figure I, showing the *arcus tendineus fossæ ischio-rectalis* (an exaggerated specimen) extending forward into the urogenital triangle. S.s.l.: sacro-tuberous ligament, cut to show the S.s.l.; sacro-spinous ligament, anterior edge of which is seen to be continuous with the concave cut edge of the *fascia lunata*; tr.Ob.f.: true obturator fascia; l.t.: lamina terminalis, cut edge, at attachment to inferior diaphragmatic fascia; f.l.: fascia lunata, cut edge, at attachment to inferior diaphragmatic fascia; m.tr.p.: musculus transversus perinei profundus. Note its insertion into the concave edge of the lunate fascia, the *tendinous fibres* referred to in the text, instead of to the bone. The direction from which this view is taken appears to give this muscle too vertical a plane, though actually it is much more oblique in the female than the transversely running muscle in the male.

junction of the *lamina terminalis*, *fascia lunata*, inferior fascia of the pelvic diaphragm (anal fascia) and the thin fascia covering the obturator muscle. Figure X shows the cut edge of the lunate fascia to the lateral side, and that of the lamina to the medial side of the line.

This white line, seen on the roof of the ischio-rectal fossa, is seldom so pronounced, but is

frequently discernible. Its weakness may be due to one or more of several factors, namely, the absence of the *lamina terminalis* as a separate entity, the lax adhesion of the true obturator fascia, but most of all to the feebleness of attachment of the lunate fascia to the inferior diaphragmatic fascia. In the particular pelvis here portrayed it exactly corresponded to the *arcus tendineus fasciæ pelvinæ* in the pelvic cavity, which coincidence would alone add to the density of both arcus; but such a coincidence does not always occur.

in Figure X and the photograph, Figure XI. Figures V and VI show this junction to be continuous with the arcus of the fossa, which may be seen in all pelves. Some irregularity occurs at the base of the urogenital diaphragm, but the general line is continuous.

The line of attachment of the lunate fascia to the inferior diaphragmatic fascia is at a varying level. In a pelvis with a strong muscular floor it is likely to be stronger and at a lower level, the fascia lying more horizontally, and the fossa becoming

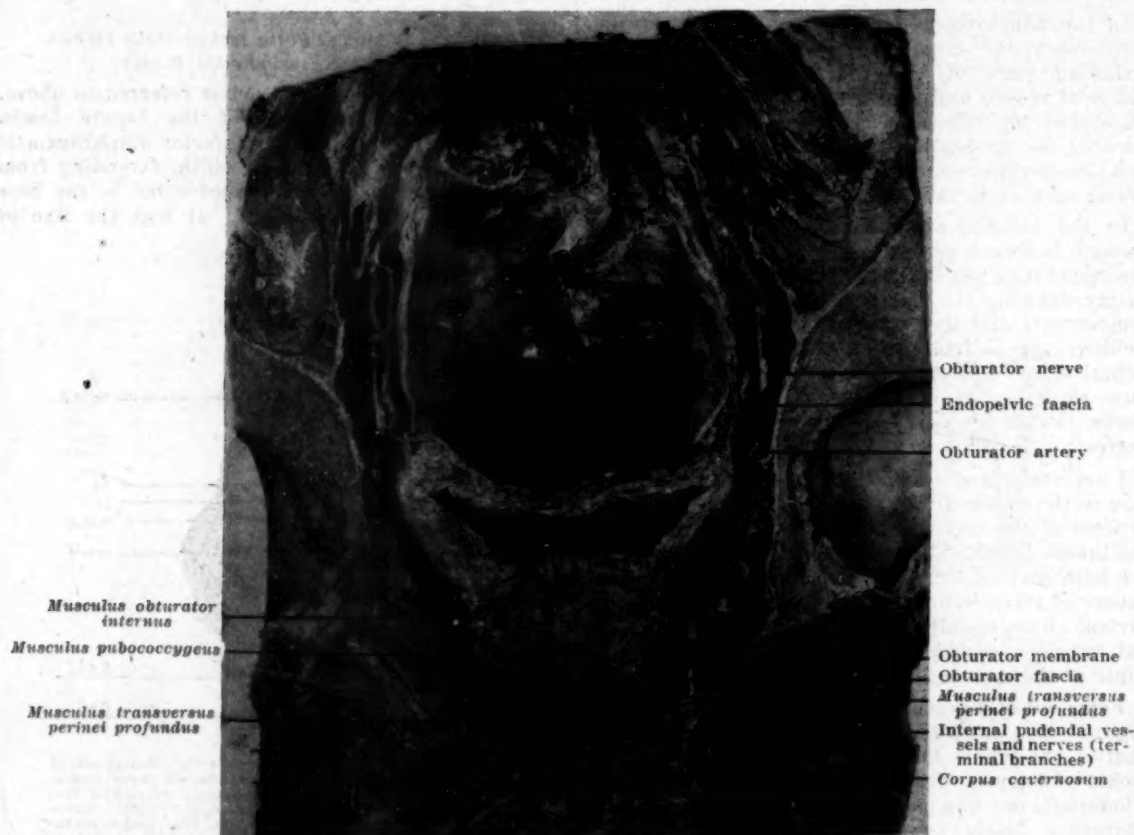


FIGURE XI.

Coronal section of a male pelvis, showing well the fibrous junction of the *fascia lunata*, true obturator fascia, urogenital diaphragmatic fascia and the muscle of the diaphragm, that is, the deep transverse perineal. The inferior pelvic diaphragmatic fascia is not assisting in the union within the urogenital triangle. The lunate fascia blends with the periosteum of the pubic ramus at this site and is difficult to depict photographically. In male pelves there is always a triangular interval at this point between *levator ani*, *transversus profundus* and *obturator internus*.

A similar union of fascial planes, a *rendezvous fibrous* referred to by Hovelacque,⁽⁴⁾ occurs in the urogenital triangle, in the formation of which junction some of these structures again take part. It is depicted in Figure V and Figure VI along the upper edge of the lunate fascia anteriorly; and to it are attached the muscle and fascia of the urogenital diaphragm. Most anatomical text-books show an area of attachment of the deep transverse perineal to the pubis, but this is not so; the attachment to the bone is indirectly through the lunate fascia, as seen

more dome-shaped than usual; but in others the concave edge of the lunate fascia tends to slide upwards on the diaphragm, the fascia lies more vertically, and the fusion is weaker. These pelvic floors appear to be more loosely assembled, the fossa becomes more pyramidal in shape, and the pelvic cavity becomes more funnel-shaped.

Pus in the Ischio-Rectal Fossa.

Elliot Smith stated that the *lamina terminalis* explains the reason for the pointing of an ischio-

rectal sinus in the lumen of the anal canal within the terminal 1.25 centimetres (half inch)—that is, well below the apex of the fossa, a location previously pointed out by Treves. Smith assumed that a horizontally transverse partition would limit the upward extension of the pus, making it point in the anal canal below this level; and he furthermore assumed that such a process of the *lamina terminalis* would offer more resistance than the fascia and muscles of the anal canal.

On the other hand, it seems to me that the course of the lymphatics would better explain this phenomenon noted by Treves. If the origin of the inferior hæmorrhoidal veins is investigated, one or two will be found originating in the submucosa and perforating the anal canal posteriorly about the middle line, quite near the junction of skin and mucous membrane (*linea pectinata*), passing outward and arching over the tapering posterior extremity of the external sphincter on each side. They then join a fine plexus of veins on the surface of the sphincter, from which the inferior hæmorrhoidal veins arise.

I have not been able to find any other vein passing from the lumen to the exterior, and have therefore concluded that this is also the path of the lymphatics and the route of infection and exudates. This fact, I believe, would explain why the opening of a sinus usually takes place near the *linea pectinata*, and also, a fact which Smith did not mention, in the posterior middle line.

Infection giving rise to an ischio-rectal abscess would spread primarily deep to the *lamina terminalis* and pass within the folds of the posterior septum which contains the lymphatics as well as the blood vessels of the anal canal. An abscess would not be confined long within this septum, but would either perforate it and appear in the fat of the ischio-rectal fossa or, very rarely, might extend temporarily upward into the supratagmental space (where this exists) before bursting into the fossa.

Goodsall's law⁽⁷⁾ states that if a horizontal line is drawn through the anus, the position of the internal opening depends on whether the external opening is anterior or posterior to this line; if it is anterior, the shortest line joining it and the anal canal points to the internal opening. I have not been able to

confirm this; but if it is true, it may depend on lymphatics accompanying the transverse perineal vessels in the middle septum of the lamina.

Figure XII indicates the direction of the spread of pus along the lymphatics and planes of least resistance. No other diverticulum or opening exists to allow extension into other parts of the pelvis; and this could occur only in the presence of some ulcerative condition, such as a malignant disease or possibly tuberculosis and actinomycosis.

In short, these diverticula and the supratagmental space are bogies which surgeons can afford to ignore.

Acknowledgements.

My thanks are due to Professor H. J. Wilkinson, late Professor of Anatomy at the University of Adelaide, now Professor of Anatomy at the University of Queensland, for providing the necessary material to dissect, for allowing the use of his photographic room and materials, and especially for his encouragement. I am grateful also to Dr. F. A. Maguire for his encouragement.

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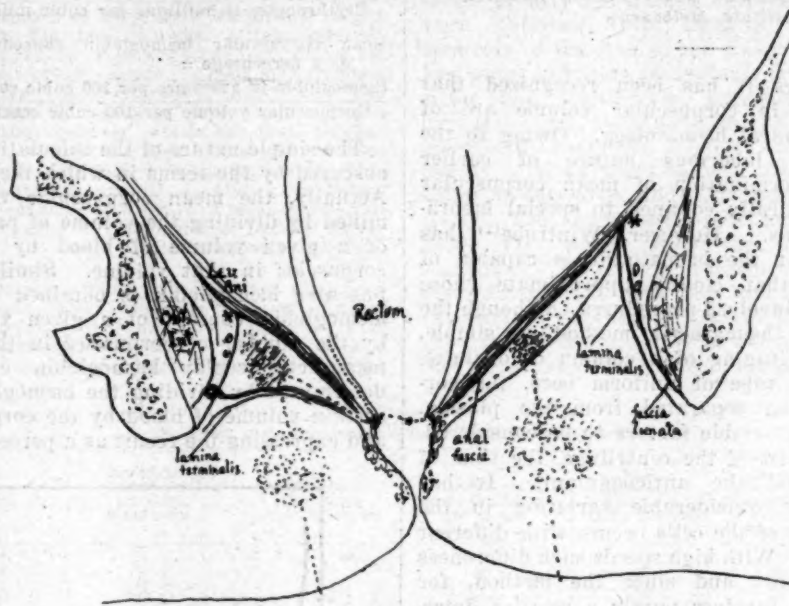


FIGURE XII.

Diagram to show the probable spread of infection in an ischio-rectal abscess along the lines of least resistance, namely, upwards in the submucosa and laterally into the posterior septum of the lamina terminalis (left side) or into the supratagmental space (right side), where such exists, from which it easily bursts into the fat of the fossa. Upward spread within the confines of the lamina terminalis is definitely prevented by the line of fusion at *.

HEMATOCRIT DETERMINATIONS IN NORMAL AND ABNORMAL BLOOD.¹

By JOHN A. McLEAN, M.D., M.R.C.P.,

Honorary Physician to Out-Patients, Alfred Hospital;
Honorary Hematologist, Baker Medical Research
Institute, Melbourne.

For some years it has been recognized that relative changes in corpuscular volume are of importance in clinical hematology. Owing to the complicated and laborious nature of earlier methods, the determination of mean corpuscular volume was practically confined to special laboratory investigations. However, Wintrobe⁽¹⁾ has demonstrated that the hematocrit is capable of yielding values that closely approximate those obtained by more involved procedures. Although the principle of the hematocrit method is simple, namely, the centrifuging of a column of oxalated blood in a glass tube of uniform bore, the corpuscles thus being separated from the plasma, there are certain variable factors to be considered. These are the speed of the centrifuge, the time of centrifugation and the anticoagulant. It has been shown that considerable variation in the degree of packing of the cells occurs with different centrifuge speeds. With high speeds such differences are not significant; and since the method, for clinical purposes, involves purely a relative determination, it follows that discrepancies of the above nature can be largely eliminated if the same centrifuge is utilized at the same speed.

In respect of time of centrifugation it has been shown that with any specified speed there comes a time at which corpuscular volume attains a constant value. In this connexion I have conducted an experiment with a Hearson belt-driven centrifuge, having a diameter of 32.5 centimetres (13 inches) and driven at a speed of 2,500 revolutions per minute. The result of this experiment is shown graphically in Figure I. It will be observed that under the above conditions a constant value for corpuscular volume is obtained in one hour.

With regard to the effect of the anticoagulant, Heller and Paul⁽²⁾ found that potassium oxalate caused a shrinkage, and ammonium oxalate an increase, in corpuscular volume. They used various mixtures and found that with a 0.2% concentration in the blood of a mixture of 40% potassium oxalate and 60% ammonium oxalate there was a minimum change in corpuscular volume.

The relative corpuscular volume having been determined and the erythrocyte count and hemoglobin value being known, the mean corpuscular volume, the mean corpuscular hemoglobin and the mean corpuscular hemoglobin concentration can be calculated as follows:

Mean corpuscular volume expressed in cubic microns (c.μ) =
Corpuscular volume per 1,000 cubic centimetres of blood
Erythrocytes in millions per cubic millimetre of blood

Mean corpuscular hemoglobin expressed as micromicro-
grammes (γγ) =

Hemoglobin in grammes per 1,000 cubic centimetres of blood
Erythrocytes in millions per cubic millimetre of blood

Mean corpuscular hemoglobin concentration expressed
as a percentage =

Hemoglobin in grammes per 100 cubic centimetres of blood
Corpuscular volume per 100 cubic centimetres of blood

The simple nature of the calculations is somewhat obscured by the terms in which they are expressed. Actually, the mean corpuscular volume is determined by dividing the volume of packed corpuscles of a given volume of blood by the number of corpuscles in that volume. Similarly, mean corpuscular hemoglobin is obtained by dividing the hemoglobin content of a given volume of blood by the number of corpuscles in that volume, and mean corpuscular hemoglobin concentration is determined by dividing the hemoglobin value of a certain volume of blood by the corpuscular volume and expressing the result as a percentage.

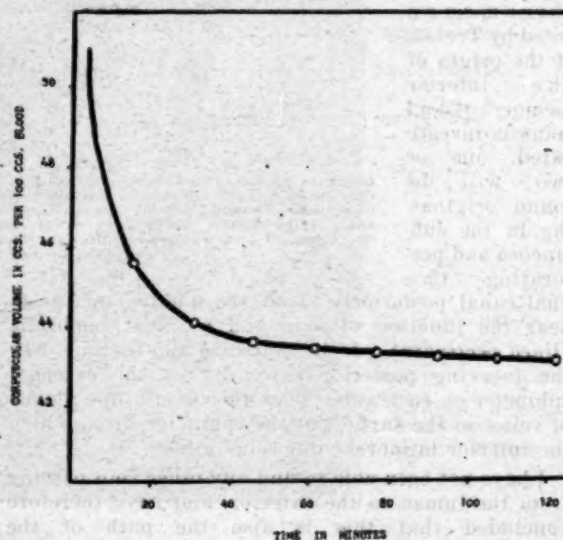


FIGURE I.
Showing constant corpuscular volume attained after one hour's centrifugation in a Hearson centrifuge at a speed of 2,500 revolutions per minute.

These determinations give absolute values and should therefore replace terms based on arbitrary standards. Mean corpuscular hemoglobin corresponds to the older conception of colour index, in the calculation of which hemoglobin percentage and erythrocyte count are reduced to terms of an arbitrary normal, which does not take into account the variations found in normal individuals and between the two sexes. The colour index cannot be accepted as being as reliable an index as mean corpuscular hemoglobin.

¹ This work was made possible by the assistance of a research grant from the University of Melbourne.

My own investigations, as described below, have been concerned first with the determination of normal standards (Melbourne), and secondly with the changes which occur in various blood diseases.

Technique.

Five cubic centimetres of blood were withdrawn from a superficial vein in the forearm with a tourniquet in position, and collected in a small bottle containing six milligrammes of ammonium oxalate and four milligrammes of potassium oxalate. All erythrocyte counts were performed by the author by means of Zeiss pipettes and a Thoma Zeiss counting chamber, which had been checked against a Burk counting chamber. Hemoglobin value was estimated with a Leitz Sahli hemoglobinometer. This instrument was calibrated against a solution of hemoglobin, the oxygen capacity of which had been determined by the Van Slyke method.²⁰ I am indebted to Miss Marks and Mr. Douth, of the Baker Medical Research Institute, for these determinations.

Hematocrit tubes were made from selected graduated pipettes holding one cubic centimetre and of uniform bore (2.5 millimetres). The tubes were made so that there were 50 gradations above a flat bottom. With a specially drawn-out pipette blood was introduced into the

hematocrit tubes to the 50 mark; the tubes were centrifuged for one hour in a Hearson belt-driven centrifuge at a speed of 2,500 revolutions per minute.

Results of the Determination of Normal Values.

Table I gives the detailed determinations in a series of fifty-five normal persons. These normals were obtained from medical students, nurses, members of the staff of the Baker Medical Research Institute, and from individuals from an out-patient clinic and wards who presented no detectable hematological abnormalities. There were thirty males and twenty-five females; the ages varied from twenty to sixty years in both sexes, the mean ages being twenty-nine and thirty-three years respectively. The figures are condensed in Table II and Table III, which show the mean values and variations. There is a pronounced variation in all determinations in both male and female series. The variation is consistently less in the case of females than in the males. This is unexpected, in view of the menstrual loss, which varies in quantity in

TABLE I.
The Results of the Examination of the Blood of 55 Normal Persons.

Sex.	Age.	Hemoglobin in Grammes per 100 Cubic Centimetres.	Red Cells in Millions per Cubic Millimetre.	Hematocrit in Cubic Centimetres per centum.	Mean Corpuscular Volume in Cubic Microns.	Mean Corpuscular Hemoglobin in Micromicrogrammes.	Mean Corpuscular Hemoglobin Concentration. (%)
M.	21	14.2	5.1	44.0	86	28	32
M.	21	15.5	5.2	42.5	81	30	37
M.	20	16.0	5.4	43.5	80	30	37
M.	40	16.5	5.2	50.0	96	32	33
M.	31	15.5	5.4	51.0	92	29	30
M.	30	15.5	5.5	49.0	89	28	32
M.	21	16.0	5.5	47.0	85	29	34
M.	20	16.5	4.8	44.5	92	34	37
M.	22	17.7	5.8	50.5	87	31	35
M.	21	16.0	5.0	47.0	79	27	34
M.	27	13.0	4.6	40.0	86	28	33
M.	21	16.0	5.3	47.5	89	30	34
M.	21	16.5	5.5	51.0	92	30	32
M.	40	14.8	5.2	47.6	91	28	31
M.	30	15.5	5.8	53.0	91	27	29
M.	40	17.0	5.0	47.0	94	34	36
M.	20	16.0	4.4	40.0	87	36	40
M.	21	14.2	4.5	45.2	95	32	31
M.	44	17.0	5.0	46.0	96	34	37
M.	23	14.2	4.7	45.5	96	30	31
M.	27	16.0	5.2	42.4	81	31	38
M.	21	17.0	5.2	45.5	87	33	37
M.	46	15.5	5.1	44.0	86	30	38
M.	20	13.7	4.5	43.5	96	30	35
M.	60	16.0	5.0	46.0	92	32	35
M.	38	14.2	4.0	42.0	91	31	34
M.	21	16.0	5.4	47.0	87	30	34
M.	50	14.2	4.7	41.6	88	30	34
M.	21	14.2	4.7	46.0	97	30	31
M.	60	13.7	4.6	41.0	89	30	33
F.	60	13.7	5.3	50.0	98	28	27
F.	21	13.7	4.4	37.0	84	31	31
F.	61	13.7	4.6	45.0	97	30	30
F.	35	14.8	5.2	45.0	86	28	33
F.	21	13.7	4.9	40.0	81	28	34
F.	28	14.8	4.8	43.5	90	31	34
F.	35	14.0	4.5	31.0	91	31	34
F.	20	13.7	4.8	42.0	87	29	38
F.	21	14.0	4.4	42.0	95	32	33
F.	21	13.7	4.6	44.0	95	30	31
F.	20	14.0	4.9	44.0	89	28	32
F.	21	14.0	4.8	42.0	87	29	33
F.	21	14.2	4.9	41.0	83	29	33
F.	28	12.8	4.2	37.0	88	30	34
F.	38	15.4	4.9	39.5	80	31	39
F.	51	12.8	4.5	44.0	97	28	29
F.	20	13.0	4.5	42.0	93	29	31
F.	40	12.0	4.5	37.0	84	27	32
F.	21	13.7	4.9	42.0	85	28	32
F.	20	13.7	5.2	44.0	84	26	31
F.	24	13.0	4.5	42.0	93	39	31
F.	65	15.4	4.7	45.5	96	33	34
F.	21	15.1	4.2	41.0	97	36	37
F.	60	15.1	4.2	40.0	91	27	29
F.	58	13.0	4.4	39.0	88	30	33

TABLE II.
Mean Values and Variation in Normal Subjects.

	Results in 30 Males with an Average Age of 29 Years.			Results in 25 Females with an Average Age of 33 Years.		
	Hæmoglobin in Grammes per 100 Cubic Centimetres.	Erythrocytes in Millions per Cubic Millimetre.	Corpuscular Volume in Cubic Centimetres per centum.	Hæmoglobin in Grammes per 100 Cubic Centimetres.	Erythrocytes in Millions per Cubic Millimetre.	Corpuscular Volume in Cubic Centimetres per centum.
Mean	15.4	5.1	45.1	13.7	4.7	42.0
Standard deviation	1.153	0.4	3.45	0.87	0.296	2.8
Coefficient of variation ..	7.4%	7.8%	7.6%	6.3%	6.3%	6.6%

TABLE III.
Maximum, Minimum and Mean Values for Corpuscular Volume and Hæmoglobin Determinations.

	Males.			Females.		
	Mean Corpuscular Volume Expressed as Cubic Microns.	Mean Corpuscular Hæmoglobin Expressed as Micromicrogrammes.	Mean Corpuscular Hæmoglobin Concentration Percentage.	Mean Corpuscular Volume Expressed as Cubic Microns.	Mean Corpuscular Hæmoglobin Expressed as Micromicrogrammes.	Mean Corpuscular Hæmoglobin Concentration Percentage.
Maximum ..	97	36	40	96	39	39
Minimum ..	79	26	29	81	26	29
Mean	89	31	34	88	29	32

different individuals and which would be expected to be reflected by a corresponding variation in blood counts. In Table IV the mean values are compared with those obtained in the United States of America. In males the American determinations are slightly greater than those obtained by the author, but in females the results are almost identical.

A large series of English determinations was not

available for comparison. Table V shows reports of blood examinations made on normal subjects in England during the past five years. There is a greater discrepancy between these figures and the American and the author's results; but even so the differences are small.

The variability and maximum and minimum values, which are not given in Tables IV and V,

TABLE IV.
Comparison of Author's Figures with Normal Means Determined in the United States of America during the Years 1929 to 1936.

Origin of Determination.	Number of Cases.	Sex.	Hæmoglobin in Grammes per 100 Cubic Centimetres.	Erythrocytes in Millions per Cubic Millimetre.	Corpuscular Volume in Cubic Centimetres per centum.	Mean Corpuscular Volume in Cubic Microns.	Mean Corpuscular Hæmoglobin in Micro-microgrammes.	Mean Corpuscular Hæmoglobin Concentration Percentage.
U.S.A. ¹	632	M.	15.9	5.3	47	89	30	34
McLean	30	M.	15.4	5.1	45	89	31	34
U.S.A. ¹	321	F.	13.87	4.7	42	88	29	31
McLean	25	F.	13.7	4.7	42	88	29	32

¹ Figures obtained from data in paper by Andresen and Mugrage.⁽¹⁾

TABLE V.
Normal Means Determined in England during the Years 1932 to 1936.

Authority.	Number of Cases.	Sex.	Hæmoglobin in Grammes per 100 Cubic Centimetres.	Erythrocytes in Millions per Cubic Millimetre.	Corpuscular Volume in Cubic Centimetres per centum.	Mean Corpuscular Volume in Cubic Microns.	Mean Corpuscular Hæmoglobin in Micro-microgrammes.	Mean Corpuscular Hæmoglobin Concentration Percentage.
Price-Jones, Vaughan and Goddard ⁽²⁾	100	M.	14.55	5.4	46.7	85.9	26.8	31
Whitby and Hynes ⁽³⁾ ..	50	M.	15.4	5.69	—	—	—	—
McGeorge ⁽¹⁾	50	M.	15.2	5.6	46.8	84.6	27.8	33
Jenkins and Don ⁽⁴⁾ ..	116	M.	15.85	—	—	—	—	—
Jenkins and Don ..	116	F.	13.80	—	—	—	—	—

TABLE VI.
Results of the Determinations in Various Pathological Conditions.

Patient's Number.	Diagnosis.	Sex.	Age in Years.	Hæmoglobin in Grammes per 100 Cubic Centimetres.	Erythrocytes in Millions per Cubic Centimetre.	Corpuscular Volume in Cubic Centimetres per centum.	Mean Corpuscular Volume in Cubic Microns.	Mean Corpuscular Hæmoglobin in Microgrammes.	Mean Corpuscular Hæmoglobin Concentration Percentage.	Type of Anæmia.
1	Pernicious anæmia	M.	66	4.5	0.8	10.0	125	56	45	Hyperchromic macrocytic.
2	Pernicious anæmia	M.	72	9.1	2.0	24.0	120	46	38	
3	Pernicious anæmia	M.	70	5.7	0.93	16.5	168	52	35	
4	Pernicious anæmia	M.	46	12.5	2.5	41.0	164	50	30	
5	Pernicious anæmia	M.	68	7.0	1.8	22.0	122	40	32	
6	Pernicious anæmia	M.	52	5.7	1.4	16.5	118	41	35	
7	Pernicious anæmia	M.	75	8.8	2.2	28.5	129	40	31	
8	Pernicious anæmia	F.	60	6.7	1.5	23.5	157	47	29	
9	Pernicious anæmia	F.	43	3.7	0.83	10.0	120	45	37	
10	Pernicious anæmia	F.	62	5.1	1.0	17.0	170	51	30	
11	Pernicious anæmia	F.	73	5.4	1.0	16.0	160	54	34	
12	Pernicious anæmia	F.	51	4.0	0.85	9.5	114	48	42	
13	Pernicious anæmia	F.	65	11.4	2.8	39.0	139	41	29	
14	Subacute combined degeneration	M.	63	4.0	0.8	11.0	137	50	36	
15	Cancer of the stomach	F.	70	9.1	2.4	30.5	127	38	40	
16	Leuco-erythroblastic anæmia	F.	61	5.0	1.1	15.5	140	44	32	
17	Gastro-enterostomy ten years earlier	M.	42	7.0	4.0	32.0	80	17	22	Hypochromic microcytic.
18	Arthritis	M.	31	7.5	5.0	34.5	69	15	21	
19	Idiopathic anæmia	F.	46	5.0	3.5	22.0	62	14	22	
20	Idiopathic anæmia	F.	50	4.0	2.8	17.5	62	14	22	
21	Menorrhagia	F.	49	4.5	3.5	22.0	66	13	20	
22	Idiopathic anæmia	F.	33	6.5	3.5	26.5	75	18	17	
23	Cancer of the colon	F.	59	3.5	2.3	15.5	67	15	22	
24	Hæmatemesis	M.	30	3.5	2.1	14.0	66	16	25	Hypochromic.
25	Hæmatemesis	M.	65	5.0	2.7	21.0	77	18	24	
26	Hæmatemesis	M.	45	2.0	1.2	9.5	79	16	21	
27	Colitis	M.	35	2.0	1.3	10.9	77	15	20	
28	Chlorosis (?)	F.	23	10.5	4.9	38.0	77	21	27	
29	Idiopathic anæmia	F.	45	10.0	5.3	41.5	78	18	24	
30	Idiopathic anæmia	F.	55	9.0	4.4	41.5	78	20	24	
31	Gastric ulcer	F.	39	8.5	4.0	32.5	81	21	26	
32	Cancer of a bronchus	F.	31	9.1	2.4	24.5	102	37	37	Secondary.
33	Cancer of the stomach	M.	60	12.0	4.1	37.0	90	29	32	
34	Cancer of the stomach	M.	50	9.7	3.8	27.0	71	26	30	
35	Lymphosarcoma	M.	43	14.3	4.9	42.5	87	29	33	
36	Lymphosarcoma	F.	58	9.4	4.3	30.5	70	22	31	
37	Myeloid leucæmia	M.	19	8.0	2.6	22.0	83	30	36	
38	Myeloid leucæmia	M.	76	8.5	2.9	20.0	69	30	42	
39	Myeloid leucæmia	M.	37	5.1	2.0	13.0	65	26	39	
40	Myeloid leucæmia	F.	50	3.4	0.87	8.5	97	39	40	
41	Hodgkin's disease	M.	45	10.3	2.9	39.0	108	35	26	
42	Hodgkin's disease	M.	56	10.8	3.8	40.0	100	27	26	
43	Pyæmia	M.	44	7.9	2.0	21.0	105	39	38	
44	Empyema	M.	19	9.1	3.3	31.0	94	23	29	
45	Pyæmia	F.	50	10.2	2.8	27.0	96	35	38	
46	Pyæmia	F.	34	10.2	4.4	35.0	79	23	29	
47	Septicæmia	F.	30	6.3	2.0	15.5	76	31	40	
48	Splenic anæmia	M.	58	6.6	3.2	24.0	75	21	28	
49	Splenic anæmia	M.	44	10.8	3.95	31.0	78	27	35	
50	Splenic anæmia	M.	38	6.8	2.5	21.0	84	27	32	
51	Myxœdema	M.	50	14.0	3.8	38.0	100	36	36	
52	Myxœdema	F.	64	9.5	4.5	42.0	93	21	22	
53	Myxœdema	F.	55	12.0	5.0	45.0	90	24	26	
54	Acute erythroblastic anæmia	M.	5	4.0	1.6	12.8	80	25	31	
55	Aplastic anæmia	M.	40	5.4	1.5	15.0	100	36	36	
56	Aplastic anæmia	M.	22	4.5	1.4	15.0	107	32	30	
57	Aplastic anæmia	M.	67	6.0	2.0	20.0	100	30	30	
58	Acholuric jaundice	F.	12	12.0	4.4	38.0	86	27	31	
59	Acholuric jaundice	F.	10	10.5	3.4	39.0	85	32	37	
60	Acholuric jaundice	F.	14	11.4	4.0	31.0	78	29	37	
61	Polycythæmia vera	M.	72	22.0	8.0	71.0	88	27	31	
62	Polycythæmia vera	M.	40	19.0	8.0	69.0	86	24	24	
63	Polycythæmia vera	M.	43	20.0	9.2	76.0	82	22	26	

were approximately the same as in the author's series. It is concluded that the results of hæmatocrit examinations of fifty-five normal persons in Melbourne corresponded with results obtained by workers in different latitudes of America and in England.

Results in Various Blood Diseases.

Apart from a broad grouping into hyperchromic macrocytic and hypochromic types, a classification of the anæmias has not been attempted. In my

series sixteen patients have been grouped as suffering from hyperchromic macrocytic anæmia. In this group the mean corpuscular volume ranges from 114 cubic microns to 170 cubic microns, the average value being 138 cubic microns; the mean corpuscular hæmoglobin ranges from 38 micromicrogrammes to 58 micromicrogrammes, the average value being 47 micromicrogrammes; the mean corpuscular hæmoglobin concentration ranges from 29% to 45%, the average value being 35%. The high mean corpuscular volume and mean corpus-

cular hæmoglobin, which are well above the normal values, are the characteristic features of this type of anaemia. Of the sixteen patients, thirteen were diagnosed as suffering from pernicious anaemia and responded to liver therapy, one was suffering from subacute combined degeneration, one (number 15) was suffering from cancer of the stomach supervening on pernicious anaemia, and one was suffering from leuco-erythroblastic anaemia which did not respond to liver therapy.

Fifteen patients have been grouped as suffering from hypochromic anaemia. The mean corpuscular volume ranges from 62 cubic microns to 81 cubic microns, the mean value being 73 cubic microns; the mean corpuscular hæmoglobin ranges from 13 micromicrogrammes to 21 micromicrogrammes, the mean value being 17 micromicrogrammes; the mean corpuscular hæmoglobin concentration ranges from 17% to 27%, the mean value being 22%. The low values for mean corpuscular hæmoglobin and mean corpuscular hæmoglobin concentration are the characteristic features of the group. Mean corpuscular volume was also low, but showed a greater variation; and in two cases the mean corpuscular volume was just above the normal minimum value (Table III). These two patients (number 17 and number 31) were respectively suffering from anaemia ten years after gastroenterostomy and anaemia associated with gastric ulcer.

The large group of anemias not hyperchromic macrocytic or hypochromic in type, and due to various causes, such as sepsis, neoplasms, leucæmia or lack of thyroxin, have been classified simply as secondary anaemia.

The mean corpuscular volume in two of the three cases of acholuric jaundice falls within normal limits. In one case (number 60) it is 78 cubic microns, which is slightly below the normal minimum value (Table III). In acholuric jaundice the mean diameter of the red cells is less than normal. The observation that the corpuscular volume is usually within normal limits is explained by an abnormal globular shape of the erythrocytes. This is termed spherocytosis, and is regarded by Haden⁽⁶⁾ and others as the fundamental variation from normal in the disease.

The mean corpuscular volume in three cases of polycythæmia is within normal limits. The mean corpuscular hæmoglobin and mean corpuscular hæmoglobin concentration are slightly below normal in two of the cases (number 62 and number 63).

Summary.

The hæmatocrit method is described. A Hearson centrifuge, driven at a speed of 2,500 revolutions per minute, gave a constant value for corpuscular volume after one hour's centrifugation.

In a series of fifty-five normal persons, values for mean corpuscular volume, mean corpuscular hæmoglobin and mean corpuscular hæmoglobin concentration were substantially the same as values obtained in America and England.

The method was applied to the diagnosis of various blood diseases, and it is recommended as a ready means of differentiating between hyperchromic macrocytic and hypochromic microcytic anemias.

Acknowledgements.

I am indebted to the late Mr. J. Sutherland for the preparation of hæmatocrit tubes, to honorary physicians of the Alfred Hospital for access to their patients, and to Professor P. MacCallum, Dr. A. B. Corkill and Dr. W. J. Penfold for their interest and helpful criticism.

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THE PROBLEM OF STRAINED BACK IN WORKING MEN.

By DAVID BARRY,
Bundaberg, Queensland.

For years many medical publications have dealt with the problem of strained back in working men, and the variety of methods of treatment suggested indicates that not one can be relied upon to achieve success. In addition the multiplicity of advertisements in the lay Press and by wireless, the evident prosperity of bone manipulators, violet and other ray experts *et cetera* prove that this crippling everyday complaint is a constant reproach to our methods.

Bundaberg is the southern centre of the sugarcane industry. Each season, with the large number of men in self-elected gangs, working against time on contract, cutting and loading cane, there must inevitably be a large number of patients who are incapacitated because of strained backs and are anxious to resume labour. This article attempts to put the management of these patients on a basis which has proved eminently satisfactory over a period of three years. In the first year the majority of these patients had already received prolonged orthodox treatment without relief, and it was as a result of attention to them that the present treatment was evolved.

Most of these unfortunates were edentulous, tonsil-less and redolent with the mixed perfumes of innumerable liniments and bearing the honourable scars of a too-enthusiastic application of medical diathermy.

Clinical Features.

The clinical features are constant. The patient's foot slips while he is cutting cane and bending down and a severe pain grips him in the lower part of the back. Alternatively he is loading at the trucks and while putting an extra amount of exertion into the hoist is suddenly seized. Usually he continues work with moderate difficulty and the pain only becomes very severe when he has gone home and cooled down. Every movement now causes agonizing pain, and his characteristic attitude, with hand on the painful area, induces his good spouse to run for the familiar kidney pills which turn his urine a satisfactory azure but which fail to relieve the pain. After a few days the condition settles down and he is fairly comfortable and can walk about without difficulty. But any bending movement, such as the typical one of putting on his boots, brings on the pain again, and now for the first time he consults his doctor.

We have thus presented to us a social unit unable to earn his living and in danger of becoming a charge on the community.

It is essential before commencing treatment to have a good skiagram taken in both antero-posterior and lateral positions. Any bony injury, such as tearing of the spinous or transverse processes, any slipping forward of the fifth lumbar vertebra on the sacrum, any sacralization or *nucleus pulposus* are all contraindications to this treatment and are without the scope of this article. Happily these conditions are rare. Osteoarthritic deposits of moderate degree are often seen and are no bar to the treatment.

These cases fall naturally into three groups.

Group A.

In the first group the pain and tenderness are confined to the iliac crest attachment of the longitudinal muscle mass consisting of the *sacrospinalis*, *latissimus dorsi*, *quadratus lumborum* and their associated fascial envelopes. The fundamentals of the treatment⁽¹⁾ are based on the theory that the fibro-muscular attachment to the iliac crest has been stretched or torn, and it is a local spasm of this area that keeps the injured fibres from approximating and healing, so that when the patient bends and stretches the muscle, the spastic and resistant fibres tear still further, thus perpetuating the injury. Hence, relieve the spasm and the first step towards cure is accomplished. Local anaesthesia is the ideal method to abolish spasm.

Treatment.

At three points on each side, as indicated in the diagram, inject 30 cubic centimetres of 0.5% "Novocain" in normal saline solution, making 180 cubic centimetres in all. Plunge the three-inch needle tangentially to the skin until the edge of the iliac crest is reached, then

draw the skin cranially and the needle will slip into the injured area. Inject a fan-like barrier of "Novocain" solution into the depths of the muscle mass. Any subsequent pain indicates inefficient injection. Now massage

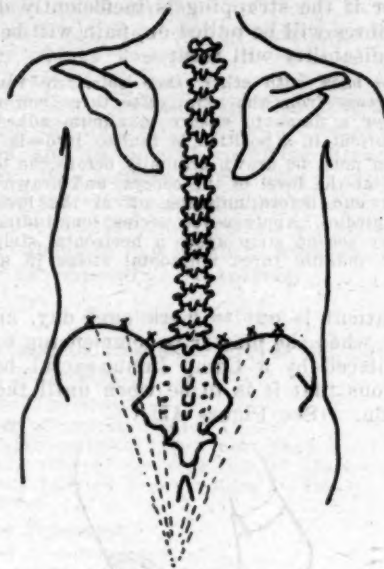


FIGURE I.
Sites for injection of local anesthetic
in Group A.

the area with the utmost pressure, with the knuckles of the hand, both to disseminate the solution and to break down intramuscular adhesions. Do this for three minutes.

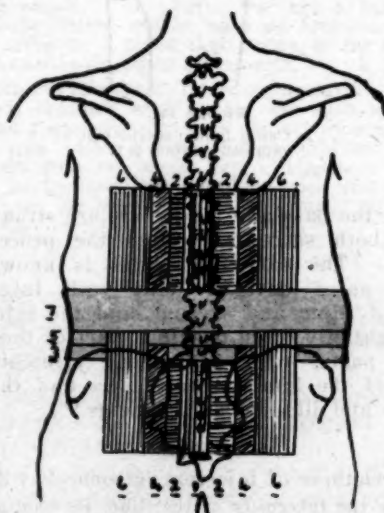


FIGURE II.
Method of strapping employed in Group A.

The patient must now be encouraged to perform vigorously every movement that formerly caused him pain. The extraordinary feeling of relief experienced when the dreaded pain is not brought on at once relaxes the local protective spasm. To

protect the loosened fibres and allow them to heal onto the bone the back must be thoroughly strapped. Here again is a vital part of the treatment; for if the strapping is inefficiently done the healing fibres will be pulled on, pain will be caused, and the disability will recur.

Rub the back with ether, then spirit, to remove the natural grease from the skin. Use three-inch strapping heated over a flame to ensure maximum adhesion, and put the patient in a position of lumbar lordosis.

The skin must be drawn cranially before the lower end is applied at the level of the coccyx, and drawn down at the upper end before finishing off at the level of the shoulder girdle. Apply seven strips longitudinally, and after every second strip apply a horizontal strip around the waist, making three horizontal strips in all. (See Figure II.)

The patient is put to work next day, and after ten days, when the plaster is commencing to loosen, it is replaced by a Camp lumbo-sacral belt with instructions that it is to be worn until the end of the season. (See Figure III.)

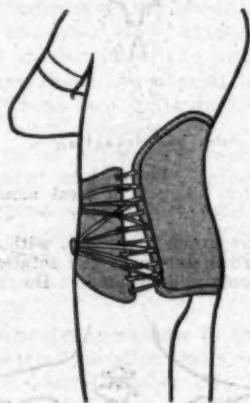


FIGURE III.
A Camp lumbo-sacral belt
applied (Group A).

Group B.

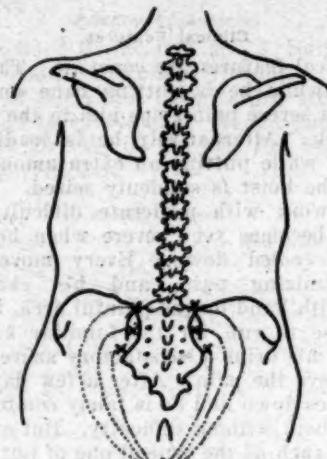
Where the pain and tenderness are situated over one or both sacro-iliac joints the procedure is modified. The sacro-iliac joint is known functionally as a dovetail joint with interlocking flanges of ilium and sacrum, and the injury consists essentially of an opening apart of these interlocking parts, with consequent stretching and tearing of the lumbo-sacral fascia and the sacro-tuberous and ilio-lumbar ligaments.⁽²⁾

Treatment.

The technique of injection is somewhat different.

Feel for the tuberosity of the ilium between the transverse process of the fifth lumbar vertebra and the posterior iliac spine. At the three points marked in Figure IV insert the needle tangentially until the rough surface of the tuberosity is encountered, and then move the needle medially, when it will be felt to sink into the fascial and ligamentous mass until the lateral edge of the sacrum is reached. At each of these three points on each side, introduce 20 cubic centimetres of solution, making 120 in all. Forcibly massage as before and then make the patient perform a full range of movement.

The patient lies in a position of lumbar lordosis. Four overlapping layers of three-inch strapping are used. Commence on the right side of the level of the tip of the coccyx and draw the right buttock forcibly towards the mid-line, and then apply the plaster, commencing 10-0 cubic centi-



Sites for injection

FIGURE IV.

Sites of injection in Group B.

metres (four inches) ventrally to the great trochanter of the femur, and pull strongly towards the left. Now draw the left buttock medially and finish off the plaster at the corresponding point on the left side. (See Figure V.)

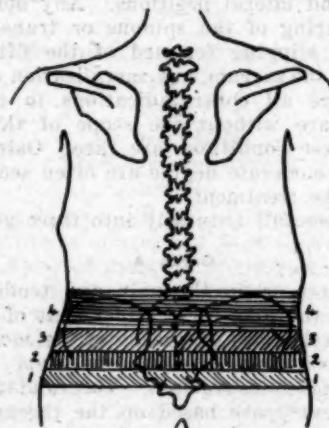


FIGURE V.

Method of strapping in Group B.

The patient is put to work next day and in ten days the plaster is replaced by a narrow Camp sacro-iliac belt. (See Figure VI.)

Group C.

In addition to pain over the sacro-iliac joint there may be radiation of the pain down the dorsum of the thigh, and this indicates pressure on the sciatic nerve, where it leaves the pelvis, by the ilio-tibial band. The diagnosis is confirmed by the presence of two signs: Lasegue's sign and Ober's abduction sign.⁽³⁾

Lasegue's sign is elicited by flexion of the patient's bent knee on his abdomen, which should not cause much discomfort. But if in this position the leg is extended at the knee severe pain will be caused.

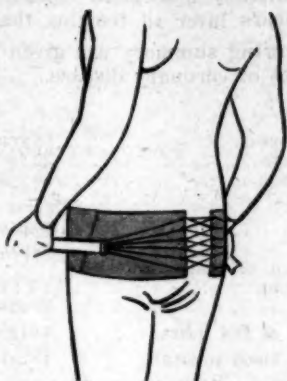


FIGURE VI.
The Camp sacro-iliac belt applied
in Group B.

To elicit Ober's sign place the patient on the unaffected side and flex the top leg to a right angle at the knee. An assistant holds the pelvis steady while the flexed knee is abducted until the thigh is in line with the body. The thigh and leg will now stay rigidly in this position without assistance and the spastic ilio-tibial band can be readily palpated between the iliac crest and the anterior surface of the greater trochanter. The operation is designed by Ober to cut this band and relieve the pressure on the nerve.

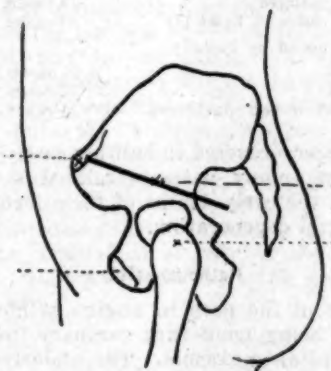


FIGURE VII.
Site of operation in Group C.

Treatment.

Under infiltration anaesthesia, 20 cubic centimetres of 0.5% "Novocain" solution being used, and with the patient lying on the unaffected side, make an incision 15.0 centimetres (six inches) long, from the anterior superior iliac spine backwards to a point 2.5 centimetres (one inch) cranial and 2.5 centimetres (one inch) posterior to the tip of the greater trochanter. This will expose the glistening surface of the ilio-tibial band. Inject 10 cubic centimetres of "Novocain" solution under this and incise thoroughly.

In my experience the assisting nurses have several times remarked on the extraordinary tenseness of

this band and the width of the separation after its division. Despite the anaesthetic tissues the patients have exclaimed at the relief suddenly experienced on its division.

There is little more to be said regarding the operation. Make sure that there is a generous interval between the cut edges and that no small bands remain, especially in the intermuscular septa. Put the limb through its full range of movement and any parts still requiring division will stand out. The incision in the skin is closed with interrupted silkworm gut and the patient is allowed up next day. He is encouraged to flex his extended leg on the abdomen and is put to work on the tenth day after the removal of the sutures.

Results of Treatment.

The results of treatment are as set out in the following statement.

Injection Treatment:

Number of patients treated	43
Completely relieved (work next day) .. .	28
Partially relieved (work within 14 days) .. .	11
Partially relieved (work within 30 days) .. .	2
Unrelieved	2

Operative Treatment:

Number of patients treated	7
Cured (work in 10 days)	6
Unrelieved	1

I can offer no explanation for the two failures in the first section. Both patients have since returned from Brisbane after extensive orthopaedic treatment and are still unrelieved and incapacitated.

The case in which Ober's operation failed had an interesting sequel. The patient was not a cane-cutter, but a railway fettler, and he returned after one month, still incapacitated. I found that flexion of the extended knee on the abdomen caused severe pain.

Under general anaesthesia I forcibly flexed the extended knee on his abdomen until his toe was on a level with his ear, and I was rewarded by a distinct snap under the operation area. After a few days' soreness he felt well and resumed work two weeks later. It appears that the band was incompletely divided at operation and this was responsible for his continued incapacity until relieved by manipulation.

Summary.

1. An account is given of a common crippling accident in the cane-fields, for which the treatment has hitherto been unsatisfactory, and which resulted in prolonged disability.

2. The cases have been classified into three groups and a detailed account of the management of each group has been given.

3. In two of these groups, as a result of the treatment, the patient has been able to work next day, whereas under the usual methods it has been weeks and occasionally months before work could be resumed.

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SOME CLINICAL OBSERVATIONS ON CORONARY ARTERY DISEASE.

By R. WHISHAW, M.B., M.R.C.P.,

Honorary Physician to the Royal Hobart Hospital,
Tasmania.

In the study of 684 private patients exhibiting symptoms or signs of cardio-vascular disease, 80 (12%) were found to have coronary disease.

Incidence.

Coronary artery disease proved to be the most common but two of diseases of the heart, being exceeded by the hypertensive type and the functional type. If organic cases only are considered, the percentage of coronary disease rises to 16.

Disease of the coronary arteries is therefore a common disease in Tasmania, as elsewhere; and it is generally accepted that it is increasing in frequency and is affecting younger individuals than formerly. The increase may be more apparent on account of better diagnosis, but this evidently is not the only explanation.

Ætiological Factors.

The increased incidence is thought to be related to the strain and stress of modern financial and business worries. A point in favour of this opinion is the observation that a higher proportion of women than formerly are victims. The reason advanced is that more and more women are sharing the burden of business and professional life. There is no doubt that the majority of these patients come from the brain workers. Both these facts are borne out in my cases.

Sex Incidence.

Osler and McKenzie gave the ratio of males to females as 7:1 from 1910 to 1923. Paul White gave it as 3:1 in 1931; and in my series it is 2.2:1, in 1937 and 1938. It is of interest to note that the highest proportion of cases is furnished by medical practitioners themselves. In a recent investigation in Kansas it was found that 40% of the deaths of medical men were due to heart disease, almost double the incidence in the general population; and 67% of the deaths from heart failure were due to coronary disease.

Age Incidence.

The average age in the present series was fifty-eight years. The youngest patient was thirty-two and the oldest eighty years of age. The robust, active, strong type of individual was the commonest victim. It is just this type that so often suffers from hypertension. The significance of hypertension *per se* as an ætiological factor diminishes somewhat on consideration of the fact that in women it is more common, yet coronary disease is less frequent. On the other hand, it has been proved that in 90% of hearts from hypertensive subjects coronary

changes are found at autopsy. It appears that the common unknown factors responsible for coronary sclerosis and hypertension respectively must be related.

Coronary disease associated with hypertension occurs two years later in females than in males.

In the following summary are given the findings in eighty cases of coronary disease.

Age incidence:

Average age	58 years
Lowest age	32 years
Highest age	80 years

Sex incidence:

Male	55 patients (70%)
Female	25 patients (30%)
Proportion of male to female patients	2.2:1

Pain 67 cases (89%)

Enlargement of the heart 41 cases (51%)

Elevation of blood pressure 40 cases (50%)

Sex distribution of elevation of blood pressure:

Males	23 (42%)
Females	17 (68%)

Average age at which elevation of blood pressure occurred:

Males	57 years
Females	59 years

Electrocardiographic findings:

No abnormality	4 cases
No examination	4 cases
Abnormalities	72 cases (90%)

Diagnostic value of electrocardiographic findings:

Diagnostic changes	39 cases
Definite changes	20 cases
Slight changes	13 cases
Deep Q wave in Lead III	22 cases

Lesion diagnosed by history:

Definite	46 cases (58%)
Probable	23 cases
Doubtful or not considered	11 cases

Hypertension occurred in half my cases. Heredity is important; many patients related stories suggesting that the early deaths of their forbears were due to arterial degeneration.

Pathogenesis.

The cause of the pain in angina is now usually accepted as being temporary coronary insufficiency with myocardial anoxæmia. The underlying lesion in 90% of cases proved by autopsy is atherosclerosis of the coronary arteries. (This information comes from the London Hospital.) This lesion can, of course, be only suspected during life, so that figures from my series would be valueless. The remaining 10% is supplied by patients suffering from syphilitic aortitis affecting the mouths of the coronary vessels, rheumatic heart disease, severe anæmia, paroxysmal tachycardia, thyrotoxicosis and diabetes. Buerger's disease should possibly be included as well. Alcohol plays no part in the ætiology, but tobacco cannot be excluded, and may well bear some relationship to the increased incidence of coronary disease.

The following summary gives the pathological conditions found by clinical examination in 80 cases of coronary disease.

Coronary occlusion	20 cases
Electrocardiographic findings in these 20 cases :	
<i>T₁</i> type	10 cases
<i>T₂</i> type	8 cases
Indefinite	2 cases
Heart block	19 cases
Bundle branch block	10 cases
Auriculo-ventricular block	4 cases
Complete	2 cases
Paroxysmal	1 case
Intraventricular	2 cases
Adams-Stokes syndrome	3 cases
Aortic incompetence (due to syphilis)	2 cases
Mitral stenosis (rheumatic)	2 cases
Chronic nephritis	2 cases
Thyreotoxicosis	2 cases
Congenital heart disease	1 case
<i>Cor pulmonale</i>	1 case
Arrhythmia	8 cases
Auricular fibrillation	2 cases
Gallop rhythm	4 cases
Paroxysmal tachycardia	2 cases
Neurocirculatory asthenia	6 cases

Symptoms.

Pain in the chest was the outstanding symptom of all the types of coronary disease, and was present in 89% of cases. In the remaining 11% some form of heart block, mostly bundle branch lesions, was present, and symptoms of cardiac insufficiency, especially dyspnoea, were complained of. Three patients had Adams-Stokes attacks. The twenty patients suffering from coronary occlusion gave fairly typical histories, except that in two cases the pain was in the left side of the chest, but not below the nipple, and in one there was no pain, but pronounced symptoms of shock were present. Four patients gave typical histories of attacks of *angina pectoris*, but the electrocardiograph indicated definite occlusion. The non-occlusive cases in which pain was present (*angina pectoris*) numbered 48. The classical substernal pain, definitely and quantitatively related to effort, was present in 35 of these; 12 patients complained of pain in the left side of the chest. In about half the total, pain radiated to face or arm.

In Table I is given the proportion of patients with substernal pain and pain in the left side of the chest, the pain being related to exertion. The twelve patients with no pain belong to the group with heart block.

It is the patients with left-sided pain, indefinitely related to exertion, whose lesion is difficult to diagnose. This will be discussed later at greater length. The pain was often described as indigestion, and very frequently it was accompanied by the eructation of gas. It was more prone to occur after meals. This fact increased the patient's belief that indigestion was the cause.

As an example of this let me quote the case of a man, aged fifty-two years, who had been treated for dyspepsia for six months by several medical men, without relief. His pain was lower in position than usual; it was in the epigastric region, and was accompanied by flatulence. He volunteered the information that his "indigestion" never came on except when he walked up a rise. The diagnosis of angina was therefore self-evident from the history.

A history of the symptoms occurring after food was common. It is explained by the fact that business people are apt to rush off to their offices after meals; and the same walk that can be painlessly negotiated on an empty stomach brings on pain when the splanchnic vessels are dilated and less blood is available for the coronary circulation.

The sensation was frequently described not as a pain, but as a constriction, a discomfort, a tightness, a clutching, choking or pressure.

Cold weather and emotional upsets were sometimes said to be precipitating factors. Several people stated that they had an attack when in bed; but questioning usually revealed the fact that the pain came on just after they had retired, and was no doubt due to the effort of undressing, in addition to the coldness of the sheets.

Signs.

The heart was found to be enlarged in just over half the cases; this finding was verified by fluoroscopy. The blood pressure was raised in half the cases.

From Table I it will be seen that hypertension was much more common in women, and that the average age at which coronary disease occurred was two years greater in women than in men.

TABLE I.
Site of Pain and Relation to Exertion.

	Site of Pain.								Relation of Pain to Effort.		
	Substernal.		Left Side of Chest.		Right Side of Chest.		No Pain.		Number of Patients Whose Pain Occurred on Effort.	Number of Patients Whose Pain Occurred at Rest.	Number of Cases in which Pain was not Related to Effort or Rest.
	Number of Cases.	Percentage.	Number of Cases.	Percentage.	Number of Cases.	Percentage.	Number of Cases.	Percentage.			
In coronary occlusion	17	85	2	10	0	0	1	5	4	15	1
In non-occlusive cases	35	58	12	20	1	2	12	20	35	13	12 ¹

¹ These patients had no pain.

Electrocardiographic Signs.

Apart from the history, the importance of which cannot be overstressed, electrocardiography yielded the most help. The tracings revealed abnormalities in 90% of the total number. (In a recent American investigation, in only 50% did the electrocardiographs indicate abnormality.) Of the remaining electrocardiographs, four indicated no abnormality. In four cases no electrocardiograph was made. All occlusive cases were confirmed. Practically half the tracings (39) were diagnostic; and definite changes, indicating probable coronary disease, were present in another 20. In 13 slight abnormalities only were seen.

Left axis deviation, unless accompanied by other changes, was not regarded as of diagnostic significance. Apart from the pathognomonic tracings (those typical of coronary occlusion and of various types of heart block) certain abnormalities may, I think, be regarded as being very suggestive of coronary disease. The following changes, though common in angina, do occur in other organic diseases of the heart: a deep Q wave in Lead III, and definite alterations to the R-T and S-T segments and to T waves. A very small or absent initial deflection in the Q-R-S complex in Lead IV sometimes occurred; also diphasic, iso-electric or inverted T wave in Lead I or Lead II. An inverted T wave in Lead III in an otherwise normal tracing is often found in health. Splitting or widening of the Q-R-S complex in Lead I, Lead II or Lead IV was also regarded as abnormal. Bundle branch and arborization lesions were indicated 12 times, and an abnormal Q wave in Lead III occurred 22 times. It must be remembered that a small Q wave in Lead III with an inverted T wave in Lead III occasionally occurs in the normal, on account of rotation of the axis of the heart.

Bundle branch block may be clinically suspected of being present if a systolic gallop rhythm is heard; but it requires an electrocardiogram for certain diagnosis. Heart block was considered to be due to coronary disease in the absence of other cause, such as rheumatic heart disease and syphilis *et cetera*.

Other Signs.

As a clinical impression it might be mentioned that dyspnoea and tachycardia were infrequent accompaniments of angina in the absence of complications. Peripheral arteriosclerosis was fairly common and was sometimes detected in the retinal vessels when the radial and brachial arteries felt normal. In many cases, however, no evidences of it could be found.

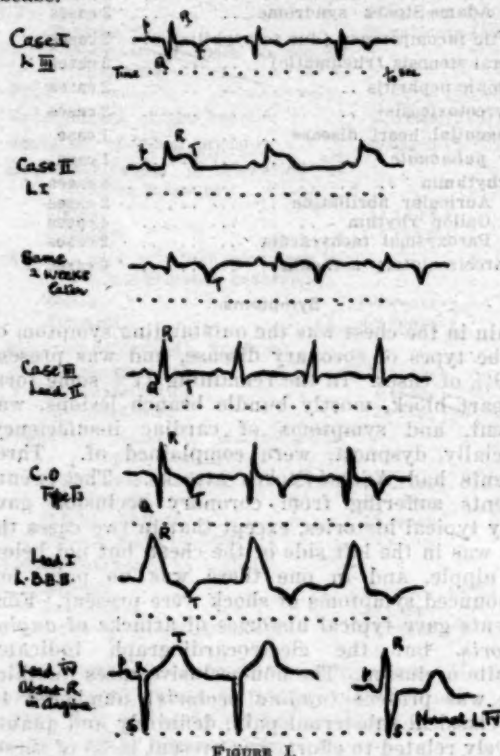
In some cases aortic atheroma was present. This was suspected when the aorta was abnormally prominent, or calcified, or of uneven density when viewed through the fluorescent screen.

Slight dilatation of the aorta with hypertension was common and was regarded as dynamic in many cases.

In two cases a small aneurysm of the left ventricle was found. Both electrocardiographs were typical of coronary occlusion of the T_a type. This usually denotes that the lesion is in the descending branch of the left coronary artery.

Arrhythmia occurred in only eight cases, true gallop rhythm in four, and attacks of paroxysmal tachycardia in two. In one of these cases the lesion was of the common auricular type, and in the other it was of the ventricular type; in the latter case the patient died.

Two patients had auricular fibrillation. This is recognized as a rare complication of coronary disease.



Frequent reference has recently been made in medical journals to the relationship between coronary and gall-bladder disease. In only two cases of this series was gall-stone colic suggested, and the symptoms were clinically distinct.

It is generally stated that in 12 to 25% of patients suffering from angina no abnormality of the cardiovascular system can be found. It is of great importance to realize this; for it is so much more easy and pleasant to pass off the symptoms as due, for example, to indigestion, which is often what the patient himself thinks.

Emphasis must be placed on the necessity of taking great care in the interrogation of the patient and in the evaluation of his symptoms, more particularly in the group of patients who show no signs of organic disease. It so happened, in this present series, that some abnormality was detected in all

cases, although in six instances it was meagre. For example, in one patient all that could be found was localized but definite sclerosis of the retinal arteries. In another, some slight dilatation of the aorta without hypertension was seen through the fluoroscopic screen. In a third case the electrocardiograph showed a small Q and an inverted T wave in Lead IV, while the three standard leads were normal. Of course, many of these minor signs may be found in people of the "coronary age", who appear in normal health. Nevertheless, they are of some significance in a person complaining of pains in the chest.

The only other signs found were heart murmurs. A systolic murmur was commonly noted, either at the base or apex. Diastolic murmurs were detected in only four cases, in two of which there was syphilitic aortic incompetence; two patients had mitral stenosis.

In the diagnosis of coronary disease, therefore, the clinical history affords by far the most important evidence, and it may give the one and only clue. In this series of cases a confident diagnosis could be made from the history alone in 58%, and in a further 29% the diagnosis was probable. Clinical examination was often confirmatory, and electrocardiographic evidence was invaluable. Fluoroscopy was also of great help, especially in ascertaining with certainty the size of the heart and in observing changes in the aorta. Exercise tests were not found to be of much help, and the adrenaline test was not used, as it was considered to be unsafe. The test of making the patient breathe an atmosphere low in oxygen content should be useful, but was not employed in these cases.

Differential Diagnosis.

Most difficulty was encountered in separating the cases of *angina pectoris* from the large functional group. A patient either has *angina* or he has not, and this should be determined as soon as possible; no half measures should be countenanced, such as a diagnosis of "pseudo-angina", "mild *angina*", "tired heart" *et cetera*.

I have attempted to separate my cases into four groups, in which the lesions appear to be definite clinical entities. (See the article by G. Bourne in *The British Medical Journal*, April 3, 1937, page 695). I believe this can be done with considerable accuracy, after local causes of pain in the chest have been excluded, such as *herpes zoster*, panniculitis in women, intercostal fibrositis and pleurisy. Gastric causes can as a rule be differentiated by the history.

The four groups are the following: (i) *angina pectoris* (*angina* of effort, *angina* of ischaemia); (ii) *angina* of coronary occlusion (*angina* of infarction); (iii) spasmodic *angina*; (iv) *angina innocens*.

In Table II are set out what I believe to be the criteria necessary for the diagnosis of each group. Other types of pain arise from the heart, but they are less common and seldom cause difficulty; for example, the pain of aortitis and aneurysm, and the fatigue pain that accompanies chronic hypertension and mitral stenosis (Paul White). This pain is usually a substernal or precordial ache. The functional type (*angina innocens*) not infrequently complicates organic heart disease.

Acute pericarditis may occasionally lead to difficulties.

TABLE II.

	<i>Angina Pectoris.</i>	Coronary Occlusion.	Spasmodic Angina.	<i>Angina Innocens.</i>
Onset	Sudden.	Sudden, when at rest.	Sudden.	Gradual.
Duration	Short; less than fifteen minutes.	Longer; hours or days.	From minutes to one hour.	Hours, days or weeks.
Subjective sensations . .	Pain, pressure, squeezing, choking.	Same as <i>angina pectoris</i> , but much more intense.	Same as <i>angina pectoris</i> .	Stabbing or aching or intermittent pain.
Position of sensation . .	Substernal, or in the upper left part of the chest and the inner aspect of the arms.	Same as <i>angina pectoris</i> , but often radiating to the face and arm.	Same as coronary occlusion.	Submammary.
Precipitating factor . .	Exertion, especially walking in the cold and after a meal.	None.	Emotion especially, but also cold and cessation of effort.	Anxiety or emotion, or cessation of effort.
Methods of relief	Rest and administration of "Trinitrin".	Morphine only.	"Trinitrin", but not rest.	Sedatives and psychotherapy.
Other signs and symptoms	No other symptoms, few signs.	Shock, fever, leucocytosis, occasionally pleural rub.	None. It occurs often in young people.	Exhaustion, giddiness, faintness, palpitation, sighing respiration.
Basic lesion	Coronary atheroma; occasionally syphilitic aortitis.	Coronary atheroma.	Coronary spasm.	None. Neurogenic.

An elderly man I saw in consultation gave a history of sudden onset of pain in the left side of the chest, which required several doses of morphine before he obtained any relief. As a "rub" was heard, it was thought he had an occlusion. He died a week later. Necropsy revealed an acute pericarditis of the "bread-and-butter" type. The cause was not discovered; it was not the "terminal" type sometimes seen in patients dying of chronic nephritis. The coronary arteries were not occluded.

The following case histories illustrate briefly the main points in each of the four types of angina.

Angina Pectoris.

A woman, aged sixty-five years, complained of attacks of sudden pain in the middle of the chest on exertion. She would have to stop whatever she was doing, and the pain would then wear off in five minutes or so. The pain was beneath the breast bone; it was caused only by effort or emotion and was relieved by rest. She was somewhat breathless on hills.

Examination revealed a slightly enlarged heart. The apex beat was in the fifth intercostal space, 8.0 centimetres (four inches) from the centre of the sternum, and a soft systolic murmur was heard at all areas. The systolic blood pressure was 170 and the diastolic pressure 90 millimetres of mercury. The peripheral vessels were palpable. The electrocardiograph revealed a moderately deep Q wave in Lead III, with no depression of the R-T complex, and an inverted T wave in Lead III.

Coronary Occlusion.

A man, aged forty-two years, in good health, was reading one evening when he was suddenly seized with agonizing pain in the substernal region, neck and left arm. He could not keep still with the pain, and was given morphine. The pain lasted thirty-six hours.

When he was examined three days later he appeared to be quite well. He had slight cardiac enlargement. His systolic blood pressure was 125 and his diastolic pressure 80 millimetres of mercury. A tracing showed changes indicative of the T_1 type of occlusion.

Spasmodic Angina.

A girl, aged twenty-nine years, complained of attacks of severe pain in the middle part of the chest. The pain resembled pressure by a tight band, and lasted from one-quarter to one-half an hour. Exposure to cold air or considerable emotion appeared to precipitate the attacks, but there was no relation to effort, and she could work hard without pain.

Examination, both clinical and by fluoroscopy, revealed no cardio-vascular abnormality. Her systolic blood pressure was 140 and her diastolic pressure 90 millimetres of mercury. The tracing showed a small Q wave in Lead I and a flat T wave in Lead IV. The T wave in Lead III was inverted, and there was some slurring of the Q-R-S complex in Lead IV.

Angina Innocens.

A man, aged forty years, complained of pain beneath the left nipple, which would last for hours or days. He also had attacks of palpitation on excitement, and this would bring on the pain. If he did extra work the pain was exaggerated, but this always occurred after the work was finished. He felt exhausted and nervous, and easily became breathless.

On examination he was nervous and tremulous, and his skin was damp. No enlargement of the thyroid gland was present, and no tachycardia occurred when he was at rest. His heart and blood pressure were normal. Fluoroscopy and an electrocardiographic examination revealed no abnormality.

This condition is common among returned soldiers, but is often met with in civil practice also, particularly in young men who think they have strained their hearts. Before leaving the question of

differentiating types of pain in the chest, I should like to point out that although most cases can be pigeon-holed into one of the groups above mentioned, and although it is helpful from the point of view of prognosis and treatment to do so, yet there are a few patients who present problems as difficult as any encountered in the practice of medicine.

Organic pain and functional pain occurred almost an equal number of times. There were 80 cases of coronary disease and 77 of *angina innocens* in this investigation.

Prognosis.

This series has been collected only during the past two years, so observations on prognosis would be of little value. Some general opinions may be helpful.

Those patients suffering from occlusion have about a four to one chance of survival. Some of the survivors remain crippled, while quite a number recover sufficiently to lead quite active lives, sometimes for several years.

A very low blood pressure after coronary occlusion is ominous, and arrhythmias of any type add to the burden. The presence of hypertensive heart disease does not always adversely affect the prognosis. The outlook in angina is uncertain. There is always the risk of sudden death, which can never be foretold, and which occurs in about half the cases. About one-third of the patients develop coronary occlusion. The average survival period after diagnosis is first established is four and a half years; but a patient may die after the first attack or live for twenty years. Those whose parents died young of heart disease fare the worst, as a rule. The outlook in heart block is poor. Those with permanent bundle branch lesions rarely live more than two years.

Angina innocens of course does not endanger life, as it is a functional disorder with autonomic imbalance. Psychotherapy in the early stages is often successful, but much less so when the condition has been established for some time, particularly if the patient has been told that his heart is diseased. This is unfortunately often the case.

Treatment.

The treatment of coronary occlusion has been so much discussed lately that it need not detain us now. It resolves itself into rest in bed for at least six weeks, sufficient morphine to relieve the pain, and measures to combat shock. Extra fluids and salt are often necessary, and oxygen is frequently helpful, particularly if pulmonary congestion is a feature of the illness.

The most useful drug for the relief of *angina pectoris* is undoubtedly nitroglycerine. It acts quickly when tablets are dissolved in the mouth and not swallowed whole, and appears to be harmless in doses of 0.00065 gramme (one one-hundredth of a grain) repeated almost without restriction. Levine quotes one woman as having consumed 1,000 tablets

in a week without ill effects. Nitroglycerine is also useful for the prevention of attacks, a tablet being taken before some necessary act, the performance of which usually brings on pain.

Restriction of activities and avoidance of nervous tension and the excessive use of tobacco, and the correction of indigestion by small meals are all necessary and often yield quite satisfactory results. Sometimes further investigations are advisable; for example, when dyspeptic symptoms are troublesome, and gall-stones and peptic ulcer have to be considered. Regular doses of sedatives are often very useful.

Surgical Treatment.

I have little experience of the results of surgical treatment. Only one patient submitted to operation. She underwent a total thyroidectomy, and so far has been free from pain. It has been suggested recently that the relief from pain occurs so promptly after this operation that it cannot be attributed to the fall in the basal metabolic rate. Some dissections were carried out last year. (See the article by A. A. Weinstein and H. E. Hoff, in *Surgery, Gynecology and Obstetrics*, Volume LXIV, 1937, page 165.) It was found that the superior cardiac nerve was closely applied to the posterior surface of the thyroid gland in many cases, and the middle cardiac nerve in some. It was suggested that these nerves might be either damaged or destroyed during the operation, with resulting cessation of pain. Upper dorsal sympathectomy or alcoholic injections into the upper dorsal ganglia often appear to be successful.

The most recent and promising form of treatment, however, is based on sounder principles, and aims at actually increasing the blood supply of the myocardium by an omental graft or by the so-called Beck procedure. This consists in grafting muscle or vascular fat onto the heart wall. Reports from America and England are very encouraging, but the mortality from the operation is great. Moreover, it appears difficult to select the patients who would be likely to survive.

I have discussed this question quite frankly with one patient who, I thought, might be a suitable subject; but he has decided, perhaps wisely, to continue to pin his faith in his future to trinitrin.

It appears likely that surgery will play a more and more important part in the treatment of coronary disease in the future. It behoves us, therefore, to be on the alert whenever we are confronted with a middle-aged person complaining of pains in the chest, so that we may diagnose coronary disease in its earlier phases with some confidence.

Summary.

1. Of 684 private patients with cardio-vascular symptoms, 80 (12%) had coronary disease; or 16% of those with organic heart disease, if the functional group is omitted.

2. There were 20 cases of coronary occlusion, 48 of *angina pectoris*, and 12 of heart block.

3. The average age was 58 years.

4. There were 55 males and 25 females, a proportion of 2.2:1.

5. Pain occurred in 89% of cases.

6. The heart was enlarged in 51% and the blood pressure was raised in 50%.

7. Abnormalities were detected by electrocardiographic examination in 90%. The value of electrocardiography is discussed.

8. The differential diagnosis between *angina pectoris*, coronary occlusion, spasmodic *angina*, and *angina innoccens* is discussed, together with some points in prognosis and treatment.

Reports of Cases.

ASPIRATION OF THE AMNIOTIC SAC FOR HYDRAMNIOS.

By ALAN GRANT,

Assistant Obstetrician and Gynaecologist to the Women's Hospital, Crown Street, Sydney.

THE purpose of recording such a simple case history is to invite comment on this method of treating hydramnios. It has been practised for years on the Continent, but it was introduced into England only five years ago by Dr. Carnac Rivett, at Queen Charlotte's Hospital.

The following history is one of five patients whom I have treated over a period of three years.

Clinical Record.

Mrs. T., aged forty-four years, *multipara*, had had seven children, of whom five were living. The eldest was aged twenty-five years and the youngest two years. At her fifth confinement twins were born prematurely, and died. At the age of eleven years she had suffered from rheumatic fever, and she had frequently suffered from tonsillitis. She had an ectopic gestation when forty-three years of age, in the right Fallopian tube. It was removed, unruptured, at six weeks. The estimated date of her present confinement was August 29, 1936.

When first seen the patient was twenty-eight weeks pregnant; this was early in June, 1936. She had not been attending the ante-natal clinic. She complained of increasing breathlessness and oedema of the feet for a period of three weeks, and stated that her abdomen was growing rapidly larger.

On examination her temperature was found to be normal. The pulse rate was 110 beats per minute. The uterus was taut and hydramnios was present. The legs were oedematous up to the knees. She was very distressed in breathing after the smallest exertion. No relevant signs were found in the heart, the lungs, the kidneys or the other systems.

Several investigations were undertaken while the patient was in hospital. The blood serum gave no reaction to the Wassermann test, and the results of the urea concentration test were within normal limits.

Three days later she became so distressed that it was decided to consider aspiration of the uterus. Accordingly a preliminary X ray photograph was taken, and the report was as follows:

Normal foetus lying in slightly oblique position, almost L.O.A. The film is clouded owing to excess of *liquor amnii*. No bony abnormality detected.

Paracentesis was carried out by the technique to be described later, and two pints of fluid were removed. The pathologist could detect nothing abnormal about this fluid. After this paracentesis the breathlessness decreased greatly and the oedema slightly. Subjective improvement was very pronounced. For two weeks this improvement was maintained.

At thirty-one weeks, three weeks after the last paracentesis, the symptoms necessitated a second aspiration, and two pints of fluid were again withdrawn. The patient again showed improvement.

Finally, when the patient was thirty-four weeks pregnant, fluid was again withdrawn. At thirty-six weeks, two weeks after this third and last paracentesis, the membranes were ruptured high up and the patient was brought into labour. The labour was complicated by primary uterine inertia and *post partum* hæmorrhage. The infant weighed 2.7 kilograms (six pounds). However, the most interesting feature of the birth was the fact that the infant turned out to be a mongol.

Never at any time after a withdrawal of fluid did labour appear to be beginning, though this is said to be common.

The puerperium was uneventful.

Technique of Paracentesis.

The operation of *paracentesis uteri* is carried out in the ward bed. The abdomen is prepared for operation. The first step is for the obstetrician himself to catheterize the patient's bladder, with the usual precautions. The abdomen is then surgically cleansed, and a point is marked about three or four inches above the symphysis, in the mid-line. The skin, fat and *linea alba* are infiltrated with a local anæsthetic. A lumbar puncture needle with stylet in position is now inserted slowly; and, as in lumbar puncture, there is an appreciably characteristic feeling as the uterus is pierced. When the needle is being introduced the point is veered to right or left so as to avoid fetal parts. If the fœtus is struck by the point of the needle there is a violent commotion in the uterus for several seconds. The stylet is now withdrawn and the fluid is allowed to flow. If the cannula becomes blocked with vernix the stylet may be passed when necessary.

After about two pints of fluid have been withdrawn the needle takes up a very oblique position in relation to the skin of the abdominal wall, and usually the surgeon has to be content with this quantity at one tapping.

Discussion.

This case illustrates the advantage of paracentesis of the amniotic sac, in that the gestation can be carried on until the fœtus is viable (28 weeks) and likely to have a good chance of surviving premature birth (32 weeks). One of the main disadvantages is that the fœtus may have a deformity after all, which is not visible in the X ray film. The prognosis for the fœtus when hydramnios is present is bad, even in the absence of deformities revealed by X rays. At the Women's Hospital, Crown Street, Sydney, the immediate and ultimate fetal mortality rate is 40% in cases in which the membranes are ruptured as a therapeutic measure. Authorities vary in giving the deformity rate as between 10% and 50%. The treatment described is undertaken mainly on behalf of the fœtus, on the assumption that it may be amongst the undeformed 50%. A preliminary X ray photograph is essential in any case, as it determines whether this method of treatment is indicated or not.

The practice of aspiration of the amniotic sac has been condemned by Professor Browne, of University College, London, in his book "Ante-Natal Care". On the other hand, Professor Monro Kerr regards it as useful, and describes it in the latest edition of his book "Operative Obstetrics".

The literature on the subject has been summarized by Professor Hendry, of Glasgow, and will be found in *The Journal of Obstetrics and Gynaecology of the British Empire*, Volume XL, 1935, page 538.

Reviews.

MASSAGE.

THE appearance of the third edition of "Massage and Remedial Exercises", by Noel M. Tidy, indicates that the work has been appreciated by students of massage.¹ The book has been slightly expanded by some half-dozen pages—to 435, exclusive of the index. Its general character and arrangement remain unaltered and are excellent. Illustrations both by line and photograph are copious, and give a very good idea of the movements in conditions described in the text.

So many diseases are dealt with that the descriptions are necessarily brief, but are quite sufficient for the purpose. The chapters on fractures will tell the masseuse all she need know of the pathology and surgical treatment. The part she should play in the after-treatment is carefully and fully indicated.

Modern thought and practice concerning pregnancy and the puerperium are reflected in the chapter dealing with the management of these states from the masseuse's point of view. Exercises are described and illustrated, and references are supplied so that further information on the subject may be obtained.

Notes on Books, Current Journals and New Appliances.

SURGICAL NURSING.

THE fifth edition of Dr. H. C. Rutherford Darling's book on surgical nursing appeared in 1935; the sixth edition has now been printed.² This in itself is sufficient indication that the book is in demand. The high standard evident in previous editions has been maintained. Some new material is presented, including a chapter on operations on the ear, nose and throat, by Dr. R. H. Bettington. This book is good enough to be regarded as a standard work on its subject. The nurse who has studied it and who keeps it by her for reference should be fit to undertake any type of surgical nursing.

ANATOMICAL STUDIES FOR NURSES.

IN 1934 Dr. E. B. Jamieson produced a series of illustrations of regional anatomy, suitable for medical students and medical practitioners. Men engaged in teaching anatomy to nurses also found them of value, and for this reason 62 plates have been chosen to form a single volume entitled "Illustrations of Anatomy for Nurses".³ The illustrations have been beautifully executed and are well reproduced on art paper. The selection for nurses has been well made. Pictorial representations of anatomical studies made by a gifted artist must have an appeal to teacher and student alike; when the artist is also a gifted teacher, their value is doubly enhanced. We recommend this small volume to nurses and their lecturers, confident in the belief that it will facilitate learning and simplify teaching.

¹ "Massage and Remedial Exercises in Medical and Surgical Conditions", by N. M. Tidy; Third Edition; 1937. Bristol: John Wright and Sons Limited; London: Simpkin Marshall Limited. Demy 8vo, pp. 468, with illustrations. Price: 15s. net.

² "Surgical Nursing and After Treatment: A Handbook for Nurses and Others", by H. C. Rutherford Darling, M.D., M.S., F.R.C.S., F.R.C.P.S.; Sixth Edition; 1938. London: J. and A. Churchill Limited. Crown 8vo, pp. 726, with illustrations. Price: 9s. net.

³ "Illustrations of Anatomy for Nurses", by E. B. Jamieson, M.D., 1938. Edinburgh: E. and S. Livingstone. Medium 8vo, pp. 64 (62 plates). Price: 7s. 6d. net.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

MEDICAL KNOWLEDGE AND LAYMEN.

IN these days of the dissemination of medical information, accurate or inaccurate, by the daily Press, by periodical journals, by popular broadcast talks and by advertisement, it is not surprising that the layman displays a familiarity with diseases that would have dumbfounded his grandfather. The degree of knowledge to which he attains depends on the layman's native intelligence, on his interest and on his available leisure. All these qualifying factors are of necessity subject to his temperament and physical make-up. If he is of the intellectual type, he learns more or less impersonally the salient facts about the human body and the disease entities to which it is heir; if he is introspective or emotional, he is thrown temporarily into mental confusion by the realization that these afflictions may affect not only complete strangers but also himself and those who are dear to him.

The intelligent layman, if his interests are not too preoccupied with other studies, may acquire a useful medical knowledge. From reliable sources he can

learn sufficient about the main physiological and pathological processes to ensure that he appreciates his own good health. He is thus enabled to recognize departures from the normal in his family and in himself, and is at the same time protected from undue worry about them. This is the person who seeks his medical adviser's help and assistance before he becomes desperately ill, and who will not allow his efficiency to be impaired by illness because of a foolish dread of medical examination. It is easy to see what splendid help such a citizen may give in any scheme of preventive medicine.

The introspective laymen, however, is likely to be deleteriously affected by the gratuitous medical information that greets him on many sheets of the daily papers and whenever he turns on his wireless receiver. He may become an imaginary invalid and try every patent medicine luridly advertised, in the hope of alleviating some or all of the symptoms from which he thinks he suffers. His difficulty is that he is unable to throw off the fear engendered by one spate of medical information before he is brought violently into contact with another; and he either fashions for himself a morbid dread of the whole medical profession, which he thenceforth shuns, or else acquires the habit of haunting some medical man or hospital out-patient department for entirely insufficient reasons.

Some of the provisions of the Medical Practitioners Bill, now before the New South Wales Parliament, are designed to curtail the activities of unscrupulous advertisers. It is hardly necessary to point out that the advertisers of valuable compounds exercise some restraint in their statements; with them we are not concerned. Any measure that could prevent the promulgation of exaggerated claims for any patent medicines would be doing the public an inestimable service. Much has recently been said about the "bottle of medicine" habit, which is increasing by leaps and bounds. The faith pinned by the uninitiated to the vaunted powers of widely-advertised nostrums is pathetic. Like Jerome K. Jerome's unforgettable character, the credulous reader of the imposing lists of symptoms compiled for his benefit by some advertisers suffers from everything but housemaid's knee.

The use of a medical terminology that would not have an alarming connotation for the layman has been suggested in the hope that it might provide another means of combating the emotional tendency to which we have referred. This may mean that ordinary medical terms, such as "cancer" and "infantile paralysis", that have become unpleasantly familiar to the general public, should be replaced by terms of less baleful significance. But it is impossible to state categorically that any medical term will do more or less harm than its suggested substitute. Words owe their significance not to their nature, but to their meaning. "Tumour" would soon become as sinister as "cancer" if these words were falsely used as synonyms.

The solution of the problem seems to lie in the manner in which medical knowledge is made available to the general public, rather than in undue attention to terminology. It is a trite saying that the unfamiliar is feared; and curiosity is so strong in the human race that people will continue to interest themselves in medical matters in spite of their fears. It would be useless, therefore, even if it were desirable, to attempt to discourage this interest; and, indeed, it can be turned to good account. But it would be advantageous if sensationalism could be removed from information dealing with illness and accident. More general instruction on matters of health and bodily function could well be given to children as part of the school curriculum. The ideal to be sought in the diffusion of medical knowledge is a presentation of the necessary facts in plain language. As far as possible fear should be excluded and enthusiasm for the maintenance of health excited.

Current Comment.

LAENNEC'S CIRRHOSIS.

THE atrophic or nodular cirrhosis of the liver described by Laennec is a form of portal cirrhosis characterized by shrinkage of the liver and the frequent occurrence of ascites. It has generally been ascribed to the excessive and long-continued consumption of alcohol; but that alcohol could not be the sole aetiological factor has long been recognized. A condition indistinguishable from atrophic

cirrhosis has been found in young children who have never consumed alcohol. Consequently, as our knowledge increases, the association of Laennec's cirrhosis with alcohol becomes more vague.

N. Evans and P. A. Gray state that the clinical impression of an association between excessive alcohol consumption and this form of cirrhosis persists in spite of the general failure to reproduce the condition experimentally in laboratory animals.¹ They quote the views of other authors. F. B. Mallory suggested that minute amounts of phosphorus alloyed with iron, and present as a contamination in liquors, might be the actual aetiological factor. W. von Gerlach discovered that the copper content of cirrhotic livers was increased, and suggested that copper in addition to alcohol might be responsible for the lesions in the liver. V. H. Moon considered that no single factor was culpable, but that several operated simultaneously. Of these, he believed nicotine, manganese and phenylhydrazine to be significant. Evans and Gray examined the records of 17,874 autopsies performed in the Los Angeles County Hospital from January 1, 1918, to May 1, 1937. Amongst these were 217 cases of Laennec's cirrhosis, representing a gross incidence of 1.2%. When arranged chronologically, the cases showed a definitely rising incidence of the disease, the commencement of the rise coinciding with the repeal of the national prohibition law. The incidence after the repeal was three times greater than that before. Examination of the sex incidence revealed a preponderance of males over females affected, in the proportion of two and a half to one. The majority of patients suffering from cirrhosis were in the fourth to the eighth decade of life. For the group as a whole the peak of incidence was in the sixth decade, but for females the highest incidence occurred a decade earlier than for males.

In this study the so-called alcoholic type of cirrhosis was alone considered, and cases of hypertrophic, biliary and syphilitic cirrhosis were excluded. Evans and Gray describe the pathological criteria for the diagnosis of Laennec's cirrhosis. They state that the liver usually appeared shrunken and deformed, and covered with yellowish brown or orange projections. It cut with increased resistance. In the cut surface distortion of the normal lobular pattern, projections of varying size and scarring were seen. The tissue between the projections was firm and grey. The main factor contributing to the death of the patient was bronchopneumonia; but in many cases it was difficult to decide whether the bronchopneumonia was the main or only a contributing cause of death. Often the pneumonic lesion was hemorrhagic and of the aspiration type. Next in order of frequency as an immediate cause of death was gastro-intestinal hemorrhage. Thirty patients (13.9%) suffered fatal hemorrhage from rupture of oesophageal varices, and of these one-half did not have ascites. When the patients had no ascites, a correct diagnosis was made in only two of fifteen instances. In the whole group ascites

¹The Journal of the American Medical Association, April 9, 1938.

was the chief factor conducing to correct *ante mortem* diagnosis. The group next in importance included cases of cirrhosis without concomitant complications. In these death was apparently due to the hepatic changes, that is, to "liver insufficiency". The livers generally were of less than average size. Of the patients in this group, 88% displayed ascites and 44% were jaundiced. A change in the gross pathological characters of the livers of patients suffering from cirrhosis, according to Evans and Gray, has been observed in the past few years. The average size and weight have tended to be greater. This increase is due in most cases to the presence of fatty change, which is paralleled in the fatty livers of chronic alcoholic patients who die without evidence of Laennec's cirrhosis. Of the 217 patients suffering from actual cirrhosis, 64 were jaundiced. In seven of these acute hepatic necrosis complicated the atrophic cirrhosis. Only five of the 153 patients without jaundice suffered from acute necrosis. Three of the 64 jaundiced patients were affected with malignant changes in the liver parenchyma.

In order to estimate the alcoholic consumption of the patients, the records were examined. In 22.2% there was a definite history of alcoholic addiction, manifested by the previous occurrence of Korsakoff's syndrome, *delirium tremens*, peripheral neuritis and repeated acute intoxication. In many instances the patient was moribund on admission and no adequate history was obtainable. In all, 46 patients out of 173, that is, 26.5%, gave a history of alcoholic abuse. Twelve per centum had suffered from syphilis, and 2.8% from tuberculosis. To sum up, alcoholism exceeded all other single known factors in frequency. Evans and Gray contend that these facts indicate that the excessive consumption of alcohol is in some manner conducive to the development of hepatic cirrhosis, but that it probably acts only as a contributing factor. W. Ophüls obtained a history of alcoholism in 31 of 34 patients suffering from Laennec's cirrhosis, concerning whom clinical data were available. R. S. Boles and J. H. Clark rejected the alcohol hypothesis, but reported that 35% of their patients were addicted to alcohol. Evans and Gray consider that the increasing addiction to tobacco and the greater therapeutic use of heavy metals may act in combination with alcohol as aggravating factors. Their investigations afforded no insight into the nature of death from "liver insufficiency". The presence of fatty changes in livers observed during the second period dealt with in the report, (1933-1937) is noteworthy. The fact that the liver was almost invariably large and fatty in patients who died of recognizable chronic alcoholism, but who did not have classical cirrhosis, and the almost complete absence of this type of change in the liver under other conditions, led Evans and Gray to the conclusion that there was an essential connexion between chronic alcoholism and fatty degeneration of the liver. When the hepatic lesions consist of typical cirrhosis and fatty change, it is probable

that the cirrhosis is in a comparatively early stage and that the fatty change is being obscured by fibrotic replacement hyperplasia. Or it may be that the fatty change is the true lesion of alcoholism, which has been implanted upon an existing cirrhosis, the cause of which is not yet known. While these observations are of interest, we still await an explanation of the cause of cirrhosis in juveniles who had never consumed any alcohol.

CHEMOTHERAPY OF PNEUMOCOCCAL INFECTIONS.

IN the daily Press and elsewhere numerous references have been made to the use of a proprietary preparation known as "M and B 693" in the treatment of persons suffering from pneumococcal infections. This substance results from the combination of sulphanilamide with pyridine, and may be written thus: 2-(p-amino-benzene-sulphonamido-) pyridine. In a recent paper Lionel Whitby describes experiments which prove that "M and B 693" is chemotherapeutically active against pneumococci of types I, II, III, V, VII and VIII in mice, and that it is as active as sulphanilamide against the haemolytic streptococcus and the meningococcus.¹ Its toxicity for animals is low; in those tested it did not produce porphyrinuria. In another paper G. M. Evans and W. F. Gaisford describe the use of this new drug in the treatment of one hundred patients suffering from lobar pneumonia.² The virulence of the pneumococcus and the prevalence of pneumonia may vary from year to year, yet the case mortality rate remains fairly constant, varying from 20% to 30%. Hence the finding by these authors of a case mortality rate of 8% among patients treated with this new drug, as compared with 27% in a control series of patients observed at the same time, is a very striking one. The authors publish protocols of all their cases with detailed histories of those patients who died. They express the hope that their findings may be confirmed. Caution should restrain physicians from placing too much reliance on the results obtained in the treatment of a comparatively small number of patients. The outcome of a case of lobar pneumonia is influenced by many different factors. It is difficult to control these factors and to assess the results of therapy.

Since the discovery of sulphanilamide an immense amount of research work has been done on this drug and its allied compounds, but of all these substances sulphanilamide itself is the only one that has been fully studied. Much work will need to be done on the pyridine compound. At ordinary temperatures it is soluble in water only to the extent of 1 in 1,000, so that difficulties in its administration may be encountered. It is of great importance to discover whether it will appear in the cerebro-spinal fluid when it is given by mouth. The results of the use of this new drug in the treatment of pneumococcal meningitis will be eagerly awaited.

¹ The Lancet, May 28, 1938.

² The Lancet, July 2, 1938.

Abstracts from Current Medical Literature.

THERAPEUTICS.

The Treatment of Hæmatemesis.

J. L. LIVINGSTONE (*The Practitioner*, April, 1938) describes the treatment of hæmatemesis. The mortality rate in various reports ranges from 1% to 10%. In 677 cases reviewed by Hurst and Ryle, only nine patients died. With profuse bleeding, primary shock may occur and may lead to death in a few hours. Severe and prolonged bleeding is followed by secondary shock and a pronounced fall in blood pressure. The essential treatment in such a case is restoration of the blood volume by transfusion. A rise in the blood urea value may occur in hæmatemesis; a blood urea reading of 75 milligrammes per 100 cubic centimetres is said to be an indication that the hæmorrhage is severe. Hypodermic injection of morphine (0.02 gramme) and atropine (0.0008 gramme) should be given at the onset of hæmatemesis. An injection of 0.0006 gramme of atropine may be given at six-hourly intervals, and 0.01 gramme of morphine may be given as often as is necessary to keep the patient drowsy for the first twenty-four hours. After this time, in the author's opinion, morphine is contraindicated, since its effect may mask the symptoms of shock due to hæmorrhage. The author advises the giving of fluid *per rectum* by Murphy's rectal nozzle, which allows flatus to pass and so prevents distension. Wide tubing, the internal diameter of which is not less than 0.9 centimetre, is used, attached to a glass reservoir, the level of the fluid in which is 10.0 to 17.5 centimetres above the anus. About 600 cubic centimetres of fluid should be placed in the reservoir every two hours and allowed to run in slowly over a period of forty to sixty minutes. The administration of fluid should then be suspended for one hour, without withdrawal of the nozzle. Liquid paraffin may be given by mouth after twenty-four hours, but no other aperient and no enema should be given for a week. Eight hours after the onset of the hæmorrhage feeding by mouth should be commenced. It should be continued every two hours if the patient can tolerate it. Witts recommends meals consisting of 150 cubic centimetres of whole milk, alternating with milk and beaten-up egg. At the midday meal 30 cubic centimetres of strained tomato or orange juice, with 30 cubic centimetres of cream, may be given, and to three of the meals 30 grammes of barley sugar or treacle should be added. On the second day 30 grammes of butter rusks or cream crackers and one slice of crustless bread, may

be given with alternate meals, and one helping each of vegetable purée, fruit purée and pudding may be added to the diet. From the second day onwards, the author has added two grammes of magnesium trisilicate in a little water to alternate meals. After forty-eight hours he prescribes two grammes of the citrate of iron and ammonium three times a day. He allows a portion of boiled or steamed fish at one meal during the third day, and after this time the routine Maclean, Sipsey or Lenhart diet for peptic ulcer is given. Transfusion of 600 or 1,200 cubic centimetres of blood may be necessary in the early stages. Indications for this are a pulse rate of more than 140 beats per minute, a systolic blood pressure of less than 90 millimetres of mercury, a hæmoglobin value of less than 40%, a blood urea reading of more than 100 milligrammes per 100 cubic centimetres. When the patient is known to have a chronic peptic ulcer, surgical treatment should be considered if hæmorrhage continues for longer than twenty-four hours. According to the author, the mortality rate of patients with hæmatemesis treated surgically varies between 5%, when the patients receive continuous blood transfusion, and 30%.

Vitamin B₁.

M. B. STRAUSS (*The Journal of the American Medical Association*, March 26, 1938) discusses the therapeutic use of vitamin B₁ in polyneuritis and cardio-vascular conditions. Beriberi, alcoholic polyneuritis, toxic polyneuritis of pregnancy, diabetic, biliary, gastrogenous and post-infectious polyneuritides and Korsakoff's syndrome are all due to vitamin B₁ deficiency. The deficiency is brought about by poor intake, lack of absorption, as in alcoholic gastroenteritis, and excessive demand for vitamin B₁ through increased metabolism due to fever or exercise. The onset of vitamin B₁ deficiency may be sudden or gradual. Weakness of the legs, tenderness of calf muscles, burning of the feet, hyperæsthesia and anaesthesia may occur. The Achilles and patellar reflexes may be decreased. Atrophy of muscles and smooth, shiny skin are noted. Usually the arms are affected later than the legs, with numbness, burning and weakness of the hands, wrist-drop, and loss of tendon reflexes. The condition must be differentiated from lead poisoning, poisoning by triorthocresyl phosphate, a contaminant of Jamaica ginger, by apol and by other abortifacients or heavy metals. Infectious polyneuritis with facial diplegia mainly affects the proximal part of the limbs; diphtheritic and arsenical neuritis have their special characteristics. The cardiovascular symptoms of beriberi are dyspnoea, tachycardia and oedema. The heart is enlarged both to the right and to the left. These symptoms and signs are not distinctive; the diagnosis of vitamin B₁ deficiency is made

on other signs of B₁ or B₂ deficiency, on a history indicating dietary defect or lack of absorption, and on improvement on vitamin B₁ therapy. Vitamin B₁ deficiency leads to anorexia and nausea. Glossitis, achlorhydria, anaemia and diarrhoea also occur, but may be due to some other portion of the vitamin B complex. The treatment of these deficiencies consists in the administration of crystalline vitamin B₁ in doses of 20 to 50 milligrammes by injection or by mouth, daily. Brewer's yeast, plain or autolysed, or powdered brewer's yeast, in doses of 30 grammes three times a day, may be sufficient. Other vitamins, iron and liver extract may be indicated for associated disorders, such as glossitis or pellagra. The author states that the results of treatment on these lines are effective in definite vitamin B₁ deficiencies.

"Cardiazol."

L. C. COOK (*Proceedings of the Royal Society of Medicine*, April, 1938) gives an extensive description of the convulsion therapy based on the original work of von Meduna, of Budapest, adding his own observations on the treatment of forty-five schizophrenic patients. The technique of the treatment is simple, and consists in the intravenous injection of a 10% solution of "Cardiazol" in sufficient quantity to provoke an epileptic fit. The typical epileptic fit is described in this treatment. Such fits are induced two or three times a week. If the patient does not respond it is considered that at least twenty fits should be provoked before the treatment is abandoned. Patients may improve after the first few seizures; but it is considered imperative to carry on the treatment so that at least three seizures are induced after the maximum recovery has been attained. The risks involved are very few. The death rate is negligible; the after effects are few and transient. Physical illness, especially if it involves the heart, lungs or kidneys, constitutes a barrier to this form of treatment. The injection must be delivered with speed if the fit is to be induced. If the first injection fails to produce a fit, a second and larger injection should be given, since, when the fit fails to occur, the patient may experience unpleasant sensations and a certain amount of terror. The typical fit is followed by almost complete amnesia, so that all memory of unpleasantness is obliterated. Sedatives must not be used for at least twenty-four hours before the giving of "Cardiazol"; but hyoscine and morphine, given an hour before the "Cardiazol", may serve to allay anxiety. The giving of these drugs does not prevent the effect of the convulsant. Food should be withheld for at least three and a half hours before treatment. Dentures must be removed and a soft rubber tampon should be placed in the mouth of the patient at the onset of the fit. Cata-

tonic patients show the best response to this treatment; but in the early stages of the schizophrenic illness all types of patient may benefit.

NEUROLOGY AND PSYCHIATRY.

Poor Social Conditions in the Production of Neuroses.

W. LINDSAY NEUSTATTER (*The Lancet*, June 25, 1938) studied three groups of fifty families: poor working-class families picked at random, small professional and clerical workers, and a group of the well-to-do. Observations were made among the children; the homes and social conditions were studied and the parents interviewed. He found that children in unhappy homes were affected chiefly where there was a parental disposition to neurosis. Placid children could, apparently, withstand adverse home conditions. Poor social conditions were not, according to his collected statistical data, in themselves a direct determinant of nervousness in children. Indirectly, adverse social conditions affected the children through the parents, and generally when the parents were already nervously predisposed. He found that economic conditions could produce, in adults of anxious disposition, severe reactive states, anxiety, depression and unhappiness. Irrespective of class or social condition, a significant relationship was found between the presence of a worrying disposition in the parents and presence of anxiety and neurotic disturbances in the children.

Bromide Psychosis.

FRANK J. CURRAN (*The Journal of Nervous and Mental Disease*, August, 1938) presents fifty cases of bromide intoxication. After a review of the literature of this subject the author states that bromide intoxication generally produces delirium, with fever, disorientation, ideas of persecution, and vivid hallucinations, usually of the visceral type. He found a skin rash in only 18% of his cases. Pupillary changes were common; the pupils were generally sluggish and widely dilated, but at times irregular, unequal or very contracted. Other pathological pupillary changes were more rarely noted. Speech defects were common, the speech being thick and slurred. Tremor was universally observed. The gait was unsteady and the deep reflexes were exaggerated. A fever of moderate degree was found in most cases. Infections of the respiratory tract were not uncommon. The breath was foetid and the tongue coated. Impaired digestion, constipation, various vasomotor changes and emaciation were present. Fatalities were infrequent. Bromide intoxication may mimic other

varieties of mental disorder. Ten per centum of this writer's patients presented the typical Korsakoff syndrome. Owing to the slow excretion of bromide, intoxication may develop within a few weeks after the commencement of the continuous administration of even moderate quantities of bromide. A great variation in susceptibility to bromide exists. Treatment consists in cessation of administration of the drug, in the forcing of fluids and in the giving of sodium chloride. As much as 5,000 to 6,000 cubic centimetres of fluid should be given per day. Sodium chloride is best given orally, 1.0 to 1.3 grammes three times a day. Some writers recommend intravenous injections of from 100 to 150 cubic centimetres of a semi-normal saline solution. While excitement should be combated by hydrotherapy, and paraldehyde should be given if necessary, other sedatives should not be given. Bromide intoxication may be superimposed upon other psychotic states, such as schizophrenia, mania and cerebral arteriosclerosis.

Histamine and Insulin in the Treatment of Schizophrenia and other Mental Diseases.

A STUDY of the symptoms which may accompany the use of insulin shock therapy induced Horace Hill (*The Journal of Mental Science*, May-July, 1938) to study the effects of histamine. He believes that some of the symptoms are due to histamine, which is known to be present in the tissues in all cases of shock, and that some are due to the hypoglycaemia. Insulin, he considers, may augment the action of histamine and *vice versa*. He directs considerable attention to the action of histamine, which is widespread and complicated. His first therapeutic experiments were conducted with histamine alone, and encouraging results were obtained. Later he combined his treatment with insulin. This combined form of treatment, he states, has not only given results as good as those obtained from the insulin shock method, but seems to bring about more beneficial results in cases of long standing. The standard dose of histamine is 0.5 milligramme, but this is varied in many cases. A poisonous dose can be anything from 2.0 to 8.0 milligrammes. It is well to begin with 0.1 milligramme. The number of injections may vary from two a day to two a week. The patient's sensations are the chief guide to the dose given, which should be such as to keep him free from unpleasant sensations throughout the course. Sensitiveness to histamine varies very much in each individual, and contraindications may be present. The duration of treatment is from four to six weeks. This course of treatment may be repeated if necessary. Every case must be dealt with on its merits; and apparently only experience will aid

in the judging and spacing of the doses. Fall of temperature produced by histamine must be carefully watched. The patient should be under proper medical observation during treatment, and attended constantly by a nurse. Asthma, increased blood pressure and diseases of the heart, kidneys and liver are contraindications to treatment by histamine. The author believes that histamine acts by its power of making the endothelial wall of the capillaries more permeable to normal plasma, thus enabling the brain cells to obtain the substances requisite for their normal function. Toxic doses are unnecessary. The percentage of successes in schizophrenic cases is decidedly significant.

Multiple Sclerosis.

GABRIEL STEINER (*The Journal of Nervous and Mental Disease*, July, 1938) believes that multiple sclerosis is caused by a specific agent; but because the nature of this agent is unknown, he finds it desirable to review the etiological significance of regional and occupational incidence. Racial susceptibility is not established. There is at present an apparent increase in the incidence of this disease. No relationship has been established between multiple sclerosis and syphilis. There is no evidence of urban preponderance. The disease seems to be unduly common among wood-workers in some European countries. Several instances are reported in which this disease has occurred in social groups and in members of the same family. A fresh case of conjugal multiple sclerosis is reported. Such cases, in the author's opinion, can best be explained by an infectious origin.

Intravenous Injection of Methylene Blue in Convulsions due to Status Epilepticus.

LASLO KAJOI AND CHARLES V. TAYLOR (*The American Journal of Psychiatry*, May, 1938) have given intravenous injections of methylene blue on 22 occasions in the treatment of 20 patients with *status epilepticus*. Entirely successful results were obtained in half the cases. Convulsive attacks ceased in from five to ninety minutes after the injection of from two to twenty cubic centimetres of a 1% solution of methylene blue. The solution is injected at the rate of two cubic centimetres per minute. The cessation of the convulsive state may be dramatic. None of the successfully treated patients complained of headache, and five of them were able to get up and resume their normal activities in from one and a half to two hours after the injection. There was a 66% reduction in the mortality rate from *status epilepticus* in a chronic epileptic group. The authors conclude that this method of controlling *status epilepticus* is worthy of wider trial.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Victorian Branch of the British Medical Association was held on May 28, 1938, at the invitation of the North-West Country Subdivision, at the Horsham Base Hospital, Dr. J. P. MAJOR, the President of the Branch, in the chair. The meeting took the form of a series of clinical demonstrations by members of the honorary staff of the hospital. During the evening Dr. W. R. ANGUS read a paper entitled "Non-Surgical Drainage of the Alimentary Tract (Lyon Technique)"; this will be published in the issue of November 19, 1938.

Tumours of the Spine.

Dr. G. R. FELSTEAD showed two patients with tumours of the spine. The first, a female, aged twenty-seven years, had been admitted to the hospital on January 27, 1938. From November, 1937, she had suffered from increasing weakness of the legs and staggering gait, which had been coming on gradually for several months. When stooping she experienced a sense of numbness in the legs, and she also had numbness and pain around the waist, more severe on the left side. On two or three occasions she had noticed hesitation and lack of force on micturition. The pain around the waist had been noticed seven years earlier, and three years before the present admission to hospital she had been similarly affected for two months. At the time of admission to hospital she had slight general weakness of the legs, tottering gait and exaggerated leg reflexes with clonus, though the plantar reflexes were not extensor in type. Partial anaesthesia to touch and pain, but not to temperature, was noted up to the sixth thoracic segment on the left side, and to the seventh thoracic segment on the right side. Lumbar puncture yielded clear cerebro-spinal fluid, not under increased pressure. No response was elicited to the Queckenstedt test. No xanthochromia was present, but the albumin content of the cerebro-spinal fluid was estimated at 56 milligrammes per 100 cubic centimetres.

From the appearances in the skiagrams it was considered that a tumour with a smooth, oval outline was present in the left side of the mediastinum, near the costo-vertebral angle, closely applied to the fourth and fifth thoracic vertebrae, and eroding the lateral surfaces of the bodies and portions of the corresponding ribs.

On February 21, 1938, with the patient under intra-tracheal ether anaesthesia, Dr. Felstead made a vertical incision to the left of the middle line, posteriorly centred opposite the fourth thoracic vertebra, and found that the neck of the fourth rib was eroded right through. On removal of 3.75 centimetres (one and a half inches) of the rib he came upon a hydatid cyst filled with daughter cysts. One cyst, the size of a cherry, occupied a cavity in the body of the vertebra. Dr. Felstead removed the cysts and inserted a drainage tube. He was unable to find any opening into the spinal canal. The wound was still draining from a narrow channel at the time of the meeting, but the patient could walk normally with very slight tottering. The partial anaesthesia had almost cleared up, and, though the knee jerks were still very active, the clonus had disappeared.

Dr. Felstead said that his object in showing the patient was to invite discussion on several points of interest. He thought the cyst was primarily mediastinal and not spinal. Some of his reasons for this view were the following: the time factor, the complete membrane without exogenous budding, the absence of an opening into the spinal column, the absence of evidence of increased pressure of the cerebro-spinal fluid, xanthochromia or Queckenstedt reaction, combined with improvement in the nervous signs after the operation he had performed. He had not carried out any hydatid tests up to the time of the meeting, and asked for an expression of opinion to guide him in the use of tests to indicate whether any other cysts were present. He

also asked for comments on the increase of albumin in the cerebro-spinal fluid.

Dr. H. BOYD GRAHAM said that he agreed with Dr. Felstead that the hydatid disease was outside the vertebral column and was not a true example of spinal hydatid disease. The Casoni intradermal test and the hydatid complement fixation test would both elicit a positive reaction if another hydatid cyst was present, and the continued positivity of the hydatid complement fixation test over the month to come would be highly suggestive of the presence of another cyst. If any indication arose, instillation of lipiodol might be useful to demonstrate the presence or absence of pressure on the spinal cord.

Dr. ERIC COOPER agreed with the previous speakers about the situation of the cyst, which was not a common one. It was frequently secondary to a primary cyst, perhaps in the liver or elsewhere at a distance. The occurrence of daughter cysts had interested him. They were apt to arise in a cyst in muscles or in structures that were frequently moving. He suggested that Dr. Felstead should have the hydatid complement fixation test carried out quantitatively; the variation in the number of minimal haemolytic doses of complement fixed from time to time would be of value as an indication of the presence or absence of further cysts. The response to the Casoni test would remain positive in any case.

Dr. A. E. COATES was satisfied that the cyst was mediastinal. The cyst pressure had caused sclerosis of bone and not a rarefying process. He advised that lipiodol should not be employed, as it was not used without risk in the spinal canal. He complimented Dr. Felstead on the happy result obtained, and he was sure that the patient would be kept under observation for the assessment of further progress and for the detection of signs of impending trouble.

Dr. Felstead, in reply, said that he had thought of making an investigation by means of lipiodol, but concluded that no useful purpose would be served.

Dr. Felstead's second patient was a male, aged twenty-nine years, who had been admitted to hospital on April 30, 1938, with complete retention of urine and spasmodic contractions of the legs, but without any cerebral symptoms. Relative rigidity of the neck muscles was observed. Partial anaesthesia and analgesia were present from the level of the sixth cervical segmental distribution downwards, together with paralysis of the right triceps muscle, but not of the deltoid or biceps muscle, and of all the muscles supplied by the right median and ulnar nerves. Paralysis of the lower limbs was practically complete.

Four months before his admission to hospital the patient had had acute tonsillitis followed by swelling of several joints. A month later he had complained of pain in the back of the right arm and forearm; and three weeks before admission to hospital he had experienced difficulty in picking up small objects. This was followed a week later by pain below the shoulder blades, which was increased with coughing, and commencing weakness in both legs. The weakness in the legs had increased, but he was able to do railway repair work until four days before his admission to hospital.

Dr. Hutton-Jones had examined the cerebro-spinal fluid, which was not under increased pressure, and had found xanthochromia and great increase in the albumin content.

The skiagrams were difficult to make and to interpret. Dr. Felstead thought there was some separation of the pedicles of the fifth cervical vertebra and a bony bridge alongside the fourth and fifth vertebrae. Lipiodol had been injected into the *cisterna magna*; and fifteen minutes afterwards and again one hour afterwards it had been shown to be held up at the level of the sixth cervical vertebra. Even after twenty-seven hours a large proportion of the lipiodol was still held up there.

Dr. Felstead thought that the differential diagnosis warranted discussion. The Wassermann test had not been applied to the patient's blood serum, so syphilis could not be excluded. He wondered whether the conditions found in the cerebro-spinal fluid and the absence of rise of temperature were sufficient to exclude tuber-

culous disease. Those conditions were probably associated with the holding up of the lipiodol.

Dr. B. HUTTON-JONES said that he wished to amplify what had been said about the cerebro-spinal fluid. On the patient's admission to hospital the condition had tentatively been regarded as poliomyelitis; but examination of the cerebro-spinal fluid had shown it to be distinctly yellow. The xanthochromia, together with the great increase in the protein content, was recognized as a sign of Froin's loculation syndrome produced by complete transverse myelitis. The xanthochromia was due to changes similar to bruising and the consequent transudation of blood pigments into the cerebro-spinal fluid.

Dr. Hutton-Jones showed prepared specimens to illustrate the xanthochromia and the white ring of precipitate, which indicated a positive reaction to the Nonne-Apel test and also to the Lochlongue-Levinson test, in which egg albumen standards were compared with cerebro-spinal fluid to which had been added a 30% solution of trichloroacetic acid. Under normal conditions the total protein would be in the neighbourhood of 0.02%; but in transverse myelitis it was increased even to 4.0% or more, approximating the total protein content of blood. Dr. Hutton-Jones considered that evidence had been obtained to establish the diagnosis of transverse myelitis, whatever its cause might prove to be.

Dr. A. E. COATES pointed out certain difficulties in the case. The spinal cord was compressed, and the site of the compression had been well worked out. The compression had been rather sudden; and there was no evidence of bone involvement or of inflammation, either acute or chronic. If he suspected the presence of a neoplasm, he had to consider whether it could produce symptoms so suddenly. By previous experience he believed a neoplasm could produce the sudden symptoms at that site. It had also to be decided whether a neoplasm, if present, was outside or inside the spinal cord in the case under discussion. The lesion had involved the dorsal nerve root, causing pain on coughing, sneezing or straining. He thought the lesion might be a meningioma, or, as it was sometimes called, an endothelioma. It probably arose from the meninges, but the lesion might be from cartilage or bone. Meningeal tumours could be of the dumb-bell type, with the large mass projecting into the neck, outside the vertebral column, and the small part projecting into the spinal canal. Such a tumour could reach the size of a pea without symptoms, and then involve the root and later the cord itself. In the present case the skiagrams made after injection of lipiodol suggested a convex surface to the tumour. With reference to further investigation, Dr. Coates thought that a Casoni intradermal test should be performed. Laminectomy was indicated; and it would be advisable to limit the operation to a hemilaminectomy on account of the site, and thus to preserve the other half of the laminae to help support the neck. He suggested an incision 7.5 centimetres (three inches) in length, centred on the spinous process of the sixth cervical vertebra.

Dr. Coates said that he would be very interested to hear later from Dr. Felstead what the findings at the operation were. If a meningioma was found, as he expected, it would probably not be very vascular, and the extraspinal portion, if any, should also be carefully removed.

Dr. ERIC COOPER commented on the pathology of the yellow fluid, which was not confined to compression or occlusion of the spinal canal, but could occur in other conditions, such as acute febrile polyneuritis. In the case under discussion the cell count was low, the protein content was high and the fluid was yellow. The original diagnosis of poliomyelitis might not be so far from the mark. The nature of the onset was interesting. The patient had complained of pain in the neck after rowing, then he had had weakness in the hands, and then had occurred the sudden onset of transverse myelitis. Dr. Cooper thought that most of the symptoms were due to transverse myelitis, which might have been caused by a tumour to which something had happened, and the tumour might be a meningioma. He would advise laminectomy as a therapeutic measure, apart from the possibility of removal of a tumour.

Dr. JOHN O'SULLIVAN expressed the opinion that the shadow alongside the vertebrae to which Dr. Felstead had drawn attention was a calcification from the thyroid cartilage. The lateral margin had a wedged appearance, and he thought a tumour might be causing a blockage at that point. It was advisable to pay special attention to the spacing in the intervertebral foramina; he had once seen a patient suffering from a meningioma in whose case widening had progressed over a period of four years. In the case of Dr. Felstead's patient he thought a tumour was present, pressing on the spinal cord.

Dr. Felstead, in reply, thanked those who had contributed to the discussion, and asked Dr. Coates whether the hemilaminectomy included hemisection of the spinous processes.

Dr. Coates said that the spinous processes were of no significance and their removal was a mere nothing. In the present case the procedure he advised presented no difficulty from the manipulative point of view, because the head could be bent over in the reverse Trendelenburg position. Puckering up of muscles was the usual difficulty; but obstructing tendons could be cut across and placed to one side, and no great disability resulted. A removal of a piece of spinous process was unimportant so far as support was concerned. Troublesome hæmorrhage would not occur if the vertebral artery was avoided. Unfortunately the last patient with similar symptoms on whom he had performed this operation had died of bronchopneumonia; and at autopsy carcinoma of the adrenal gland had been found, as well as secondary deposits in the vertebra and elsewhere.

Optic Atrophy.

Dr. G. FORSYTH showed a girl, aged eighteen years, who, on December 31, 1937, had suddenly lost the sight of her left eye. The blindness was preceded for a few minutes by a flickering ring of light, which rapidly narrowed down until she had only a small amount of central vision. The loss of vision had persisted to the time of the meeting. The girl had previously been in good health, though she had had rheumatic fever in childhood, and because of recurrent tonsillitis her tonsils had been removed in March, 1936.

Dr. Forsyth said that he had seen the patient originally three months after the onset of loss of vision. The field of vision of the left eye was grossly contracted. The left pupil was slightly dilated and reacted very sluggishly. The optic disk was pale, the edges were slightly blurred, the arteries were narrowed and the veins were unaltered. The lamina cribrosa was not visible. Dr. Forsyth had noted the presence of a mitral systolic murmur and a faint presystolic cardiac murmur, but the heart was not dilated or decompensated. The blood serum failed to react to the Wassermann test, and the cerebro-spinal fluid was normal. No evidence of infection of the nasal sinuses was found, even on radiographic investigation. In a skiagram the area of the *sella turcica* was of normal appearance. No abnormality of the nervous system suggestive of insular sclerosis was obtained. No speech alteration had occurred, and no nystagmus, no euphoria and no loss of reflexes. Dr. Forsyth said that the condition had been regarded as due to an embolism of the retinal artery, occurring as a sequela of mitral stenosis.

Intermittent Hydrarthrosis of the Knee Joints.

Dr. Forsyth also showed a young man, who had complained of intermittent swelling of both knee joints of two years' duration. In the first place the swelling had been occasional only and accompanied by much pain, but later the swelling became increasingly frequent and the pain much less severe. Immediately preceding the time of the meeting the frequency of swelling was about once a week and the duration a few days. Often the joints were swollen at the same time, but that was not invariably the case. Dr. Forsyth said that extensive investigations and treatment had been carried out, but he was at a loss to explain the ætiology satisfactorily. The blood serum failed to react to the Wassermann test or to the complement

deviation test for Neisserian infection. Repeated investigation of fluid from the joints for tuberculous disease had been unsuccessful, and the von Pirquet skin test elicited no reaction. Attempts at culture from the faeces yielded no *Streptococcus viridans* or *Streptococcus hemolyticus*. The nasal sinuses appeared to be healthy, and no organisms were grown from the material obtained by proof puncture of both antra. Prostatic massage had been carried out without revealing any evidence of infection. The teeth were all extracted and the gums were examined radiographically, with normal findings. The urine had been repeatedly examined for the presence of albumin and sugar or for other abnormalities without success.

Dr. H. BOYD GRAHAM suggested that in the circumstances, as the presence of a focus of sepsis had not been established in spite of the intense investigation, the aim of treatment should be directed towards raising the resistance to infection by general measures. As a general measure he advocated that a course of injections of "Novarsenobillon" might be worthy of consideration.

Dr. ERIC COOPER said that there was still a possibility that the hydrarthrosis had a Neisserian basis. He proposed that fluid from the knee joint should be subjected to the complement fixation test.

Dr. A. I. CHAPMAN expressed the opinion that the course of the condition would remain unaffected by treatment.

Dr. Forsyth said that the patient had had a course of injections of "Novarsenobillon" and that the complement fixation test had been performed on fluid from the joint.

Acquired Hydronephrosis.

Dr. Forsyth also showed a male patient, aged twenty-nine years, who had had a urethral stricture following on a Neisserian infection eight years earlier. He had been treated elsewhere by the passage of sounds over a period of six months, by undergoing external urethrotomy in 1933, and by suprapubic drainage over a period of five months. At intervals the urethra had been blocked and the urine had dribbled away; and throughout, in all probability, the bladder and the kidneys had been severely infected.

The patient was admitted to the Horsham Base Hospital suffering from acute retention of urine. A filiform bougie was passed, and eventually a graduated series of gum-elastic catheters were introduced. By means of mandelate therapy and bladder lavage the infection was cleared up and the suprapubic fistula closed. The urethra was comparatively patent. Dr. Forsyth showed, in a skiagram made after the introduction of lipiodol, the position and degree of the stricture. He also showed a skiagram obtained after the injection, without much pressure, of 15% sodium iodide solution through a catheter into the bladder. The ureters were dilated and tortuous, and both kidneys were hydronephrotic.

Dr. JOHN O'SULLIVAN congratulated Dr. Forsyth on the excellence of the films he had shown. He referred to the incompetence of the sphincters at the lower end, where the ureters entered the bladder.

Dr. J. THOMSON TAIT said that utter inadequacy of the uretero-vesical valves was present, from which there could be no recovery. As much drainage as possible was required; and if the calibre of the urethra was small, internal urethrotomy could be performed. If the urethra was large enough, a tied-in catheter could be introduced. This treatment should be combined with the administration of urinary antiseptics.

Dr. STANLEY WILLIAMS said that in such a case as that of the patient shown by Dr. Forsyth it would be possible to demonstrate peristaltic waves in the ureters. That could be done by introducing sodium iodide solution into the bladder and examining the patient in an up-ended position by means of a fluoroscope.

Epidemic Infective Jaundice.

Dr. R. J. A. HENDERSON said that a series of people, mostly young, had been admitted to the Horsham Base Hospital recently, suffering from jaundice, and that most of them had recovered rapidly and completely. He showed an elderly man who had been admitted to the hospital with a history of jaundice over a period of four or five weeks, associated with slight abdominal pain and slight tenderness over the liver. Very little skin irritation was present and no type of food distressed him. He was intensely jaundiced while in the hospital, but did not seem to be ill in other respects. The Casoni intradermal test for hydatid disease elicited no response. The erythrocytes numbered 4,300,000 and the leucocytes 9,000 per cubic millimetre of blood. There was no increase in the blood sugar. The stools were pale, and bile pigments were present in the urine, but no albumin or sugar was found. The gall-bladder could be seen faintly in a special skiagram. The patient seemed to be very well, but was jaundiced. Dr. Henderson invited comments on the pathology and treatment.

Dr. ERIC COOPER considered that laparotomy should be performed.

Dr. W. R. ANGUS referred to the danger of attempting radiographic visualization of the gall-bladder in jaundiced subjects. He spoke of a report by Dr. Illingsworth, published in 1927 in *The British Journal of Surgery*, of a fatality from phenolphthalein given by mouth to a jaundiced patient. Dr. Angus inquired whether the patient became worse after the investigation Dr. Henderson had mentioned, and expressed the opinion that the jaundice was probably of the epidemic infective type, though it was possible that the patient had chronic trouble in the head of the pancreas.

Dr. JOHN O'SULLIVAN said that, apart from the danger to which Dr. Angus had referred, the test was not of value in the case of a jaundiced patient and was contraindicated on practical grounds.

Dr. B. HUTTON-JONES thought that the patient had infective jaundice, which could be deep.

Dr. R. J. A. HENDERSON said that the radiographic investigation had been carried out almost four weeks before the time of the meeting, when the jaundice was not nearly so deep. He had found it very hard to decide whether he should adopt an expectant attitude or should operate with the object of inspecting the affected area.

Chronic Osteomyelitis.

Dr. B. HUTTON-JONES showed a boy, aged thirteen years, who some three years earlier had had acute osteomyelitis. Since the onset he had had progressive new foci in various bones. Dr. Hutton-Jones had seen him professionally for two or three weeks immediately preceding the time of the meeting, on account of osteomyelitis of the humerus, and had evacuated approximately one pint of pus from the shoulder and deltoid region, from which had been obtained a pure culture of staphylococci. He asked for suggestions concerning future treatment and prognosis.

Dr. F. KINGSLEY NORRIS said that on account of the pallor of the boy he thought that blood examination would establish the presence of a severe degree of secondary anaemia. He thought that the patient should be given a blood transfusion.

Dr. H. BOYD GRAHAM referred to the value of vaccinating the donor of the blood with a vaccine prepared from the staphylococci isolated from the pus. The transfusions of blood should be small in amount and repeated frequently. He thought that the prognosis was poor and that lardaceous changes in the organs were probably in progress.

Dr. STANLEY WILLIAMS suggested that an attempt should be made to stimulate an antitoxic response by injections of staphylococcal toxoid, which was obtainable from the Commonwealth Serum Laboratories. Preliminary testing

of sensitivity should be carried out intradermally. General treatment should be persisted with. He adopted the view that the metastases were laid down in the early phase of staphylococemia.

DR. A. E. COATES said that the type of case interested him very much. Children aged fourteen or fifteen years went to the Royal Melbourne Hospital not infrequently requiring a great deal of building up after suffering for a long time from the effects of osteomyelitis, for which they had probably been treated earlier at the Children's Hospital or elsewhere. They required blood and were given small repeated transfusions. Dr. Hutton-Jones's patient had had staphylococcal pyemia and it was necessary to clear up the local foci. The one in the arm had to be treated surgically. The elbow, the wrist and the hand should be fixed in addition to the shoulder. The boy was moving the muscles and stirring up the focus. It was important to immobilize the whole limb efficiently to obtain rest. During the period of rest the supplementary treatment already mentioned should be carried out. With reference to the surgical treatment of the local focus, Dr. Coates said that if pus was present under tension it must be released. There was an abscess in the bone, which must be effectively drained when the time came. He advocated saucerization of the bone. If it was thoroughly guttered along the shaft the wound would heal within three or four weeks. Bone was a tubular structure, and the pus was in the medullary cavity. Even if the bone was fractured no great harm would result.

DR. STANLEY WILLIAMS dissented from Dr. Coates's advocacy of complete saucerization, and expressed the

opinion that more conservative surgical treatment should be adopted.

DR. ERIC COOPER said that repeated blood transfusions were not relatively safe. On each occasion blood typing should be carried out even if the same donor was to be used, and the interval between transfusions should be kept under seven days.

NOMINATIONS AND ELECTIONS.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Diamond, Bertram Hershall, M.B., B.S., 1935 (Univ. Sydney), 24, Marlborough Hall, Roslyn Street, Elizabeth Bay.

Reiter, Nicholas, L.R.C.P. (Edinburgh), 1936, L.R.C.S. (Edinburgh), 1936, L.R.F.P.S. (Glasgow), 1936, State Hospital, Lidcombe.

Lee, Milton Raymond, M.B., B.S., 1938 (Univ. Sydney), Royal North Shore Hospital, St. Leonards.

The undermentioned has applied for election as a member of the Victorian Branch of the British Medical Association:

Rochlin, Oscar, L.M.S.S.A. (London), 157, Spring Street, Melbourne.

Proceedings of the Royal Commission Appointed to Inquire into Matters Pertaining to National Health Insurance.

THE wreck of the air liner *Kyocema* and the tragic loss of human life that accompanied it are now common knowledge. Among the victims were Mr. L. S. Abrahams, K.C., counsel for the British Medical Association before the Royal Commission, Mr. A. C. Gain, junior counsel, and Mr. J. I. Massie and Mr. J. W. Shirley, the representatives of the firm of Messrs. Allen, Allen and Hemsley, the solicitors instructing counsel for the British Medical Association. The sympathy of the profession throughout Australia is extended to their relatives.

Wednesday, October 19, 1938.

The sittings of the Commission in Perth opened at 10.30 a.m. on Wednesday, October 19, 1938.

Mr. Dovey: May it please Your Honour and members of the Commission: When the sittings of this Commission began early in August I issued an invitation publicly to any person or organization who might be able to assist the Commission, with an intimation to them that such assistance would be welcomed. Since that time we have visited every State, travelling some 4,000 miles, and it is not until we reach Perth that there is any response to the invitation. I am happy to say that on our arrival here we found that the State Department of Health had prepared some figures and an outline of evidence which, I venture to suggest, may be of material assistance to this Commission when it comes to consider the position of medical practitioners in the remote parts of the State, not only this State, but other States, and also in the sparsely settled districts. Mr. Thurkle, the Inspector of Hospitals in the State, an officer of the Department of Health, will be put before the Commission to give evidence in the first place of the system of full-time district medical officers, who work under contract with the Government at a

salary, and who collect fees from the patients, the people whom they serve, but who do not retain any of those fees, accounting for the whole of them to the Government.

Mr. Thurkle will, of course, elaborate that position in his evidence. There are some five of these officers, and they are stationed at townships in the north-west of the State, namely, Broome, Derby, Port Hedland, Roebourne and Wyndham. The doctors at Wyndham and Port Hedland are what might be described as flying doctors. That is to say, they use aerial transport in conjunction with a service known as the Australian Aerial Medical Service, from whom also short evidence will be taken at these sittings. Those men are all paid a salary, and, in addition to their duties as medical officers, they are the resident magistrates.

Mr. Gain: The two or the five?

Mr. Dovey: The five of them. There are no legal qualifications necessary apparently for the position. They exercise summary jurisdiction, much the same as justices of the peace do in other places throughout the Commonwealth, where there is no police or stipendiary magistrate. They are appointed for a short term, I think two years, at a salary of £1,000 a year, and they are called upon to attend all or any of the people who may require their services in those districts. In the nature of things, they are called upon to travel very many miles at times. For that they are paid mileage rates, at the rate of 9d. per mile.

Mr. Gain: Both ways?

Mr. Dovey: I think so, but that will be made plain. There is an exception at Derby, where the officer has to traverse what Mr. Thurkle will describe as the worst roads in the Commonwealth. As to that, of course, no doubt there will be a good deal of competition, from what we have heard. In his case he is paid 1s. per mile. The doctor

provides his car, petrol and all other things necessary to operate the car. He is provided with quarters, for which a small rental is paid. The doctors treat the patients and charge them fees on a scale which will be put before the Commission. They are obliged to keep clinical records, and also records showing the amount of moneys received from the patient, the amount of moneys charged, and they account for those moneys to the matron of the Government hospital which is situated in each of those towns, and she, in her turn, accounts to the Treasury. At the end of two years they are granted some leave, and if, on undertaking or expressing their willingness to undertake a further two years' contract of service, they are granted some longer period of leave. That, briefly, is the scheme in regard to full-time district medical officers.

In certain other parts of the State there are part-time district medical officers, but the fees paid to them are not nearly so high as those paid to the full-time medical officers, but that will be explained in more detail later. In other parts of the State there are doctors who are subsidised, who are other than district medical officers. They are subsidised by the payment of a small amount, ranging from £20 to £50, and that payment is made to them in order to obtain from them free service to indigent people, persons in hospitals, aborigines and others of that type. While giving that treatment to indigent persons they are accorded the right to take their own private patients into those hospitals in those particular districts and charge them fees. The Commission will be told that all hospitals, with the exception of the Perth Hospital, are known everywhere as intermediate hospitals, that is, fees are paid by the patients according to their means. I think it will be found that in most cases there is a fixed rate. In the Perth Hospital there is an income limit of somewhere about £5 a week. In practice that means that no person receiving an income of more than £5 a week can receive treatment in the Perth Hospital as an in-patient. If, however, by force of circumstances a person whose income happened to be higher than that were admitted as an in-patient of necessity, he is treated and charged fees both by the hospital and the honorary doctors. The honorary medical staff do not put those fees into their own pockets, but apply them to what is called an "honorary fund", which is used for the provision of improvements and instruments and other facilities for medical and surgical treatment in the hospital. I do not propose to say more about that now; the figures will be given in evidence.

Interesting information will be put before the Commission as to the proportion of fees collected by these full-time medical officers, and it will be seen, speaking in round figures, that approximately 75% of the fees charged are collected. The terms and conditions of the contract with the different doctors will be tendered, and the Commission will be able to read them, and my friend to see them for himself.

Apart from the schemes I have outlined already, there is another scheme in certain parts of the State whereby doctors are encouraged to settle in sparsely populated districts under a guarantee which is made to them by the Government of £600 for the first year, and if the services given by the doctor are satisfactory, that guarantee is sometimes extended for a further year. Incidentally, Mr. Thurkle will tell the Commission that there has been a certain amount of difficulty on the part of the Government to get men to go into those places at that figure, and it has been urged upon the Government that the fee should be increased from £600 to £700, but the Department, in its wisdom, thinks £600 is a reasonable amount.

Another thing Mr. Thurkle will tell the Commission in respect of medical and surgical treatment is that in this State an urgent case is never refused by the hospitals. Although hospital accommodation might be taxed very severely, room is always found for urgent cases. The test of urgency cannot be left to the patient's judgement, but to the judgement of his own medical adviser or the resident officers of the hospital.

When we were in Kalgoorlie evidence was put before the Commission of a scheme of contract practice which differs in some measure from the friendly society contract practice with which the Commission is now quite familiar. Evidence will be put before the Commission today of a somewhat different scheme which is in operation in mining districts other than Kalgoorlie and Coolgardie, and which, as far as I can see, has all the merits of the one of which we heard in Kalgoorlie, and has not what might be regarded as one of the defects of the Kalgoorlie system. I refer to that part of the Kalgoorlie system whereby a doctor is obliged to pay for the nursing and hospital treatment of his patients. What I am about to say now has nothing to do with Mr. Thurkle, and is a statement of my own. I venture to suggest that it may not be always in the best interests of the patient that the doctor should be in such a position as to be obliged to pay for the hospital fees of his patient. There might be the temptation, which in some cases might be succumbed to, to refrain until the last possible minute from sending a patient to hospital and thereby incurring the obligation to pay money. In these other districts the practice is that the miners pay from 1s. 6d. to 2s. a week to the hospital. Out of that fund the hospital board pays the doctor 35s. *per annum* per member for treatment of himself, wife and family—medical treatment only. He is not the slightest bit concerned with the hospital treatment. The difference between the 35s. *per annum* and the annual sum which is represented by the payment of 1s. 6d. and 2s. per week is retained by the hospital board and used by them for the maintenance of the hospital and the treatment of these people. In the timber areas a similar scheme applies, except 1s. 6d. is paid to the hospital, and not 2s., and the hospital in the same way as in the mining districts pays the doctor, but in this case 30s. per member. That is another scheme which we thought should be brought to the notice of the Commission, because, after all, the Commission is called upon to investigate the subject matter of the present inquiry in the light of existing contract practice, and in that way I submit "contract practice" does not necessarily mean friendly society contract practices only.

Some figures will be put before the Commission by Mr. Thurkle, of the Medical Department, dealing with hospital boards and setting out the number of members contributing to these funds. The number of dependants have been estimated by the secretaries of the respective hospital boards, but I will make it quite clear that the actual number of dependants will not be stated, only an estimate based on the knowledge that the secretary has. With regard to these figures, they will be subject to exactly the same criticism as those my friend may submit from time to time.

Mr. Gain: Will all those secretaries be called?

Mr. Dovey: No. Other evidence will be called today and placed before the Commission. This evidence will come from the friendly societies in Western Australia, but I will content myself with saying that, as in other States, the relationship between the friendly societies and a medical practitioner is based on a varying rate: 24s. in Perth, 26s. in Kalgoorlie and 30s. for the rest of the State. Some 70% of the friendly society members live in the metropolitan area, which includes from Midland Junction to Fremantle.

In passing, and dealing with the question of the friendly societies, I would like to refer to an expression of opinion which was broadcast by an anonymous person on the British Medical Association through the national station, Perth, in April, 1935. I would claim the Commission's forbearance while I read one or two of the passages, and then I will put it in. The first one is on page 7 of this little booklet, and reads:

In long past years the lodge secretaries and lodge doctors were hereditary enemies. The secretaries used to strive to get their pound of flesh from the doctors, sometimes even to avoid paying for it. The doctors—in many cases from feelings of grievance—regarded the secretaries as their bitter opponents. They were

about as friendly as the Houses of Montague and Capulet. Now with the softening passage of time each has discovered points to admire in the other. Any faults that may be discovered on either side are attributed to individual failings, and not ascribed to lodge secretaries and doctors as a class. The lion and the lamb lie down side by side, and they meet when necessary to discuss grievances or amend rules. Representatives of the Grand Council of Friendly Societies and the B.M.A. have met most amicably and have discovered each other to be decent human beings.

There is another passage which paints the picture very well. It reads:

Now to the uninformed it must be a mystery why a doctor, unless in dire poverty, should wish to saddle himself with the treatment of a family of four or more for 24s. a year. One visualizes midnight calls in wintry weather and midday calls in blistering heat. One would expect that the patients would fly to the doctor for every trifling ill, and all must become part of the waiting room furniture. The visit would only cost a tram fare, perhaps not even that. After nearly 30 years' experience of this class of work I can assure you that such is not the case. An unnecessary call or visit is the exception. The lodge patient hates to call a doctor out at night or after hours, and at times has to be reprimanded for hesitating, out of consideration for the doctor, to send an urgent call at night. It is beyond doubt that the lodge patient is much more considerate than the paying patient in the mass. It can therefore be seen that if lodge practice is a form of harness it is at least not uncomfortable harness.

Then from the monetary standpoint the lecturer goes on to mention this:

As the years flow on, the lodge doctor becomes guide, philosopher and friend to his patients. Years ago, when there was a move to demand higher lodge rates, one medical man, with a large lodge and private practice, said that sooner than bleed his lodge patients he would resign from the B.M.A. It was not a question of money with him. He did not wish for a few pounds to destroy the mutual feeling of trust between him and his lodge members.

The young doctor who is starting practice with a list of lodge patients has an assured income. He can visit any puzzling case as frequently as he desires. The patient is pleased with the extra attention; the doctor is content, and feels he is not missing any fact that might aid him in diagnosis. If the same man were visiting a paying patient the latter might suspect the doctor of over-visiting and the feeling of trust that must exist between doctor and patient would be dissipated, to the detriment of both.

There are other matters in this broadcast that I do not propose to read at this stage, but I venture to suggest that this broadcast, sponsored as it was by the British Medical Association in this State, expresses more adequately perhaps than any evidence we have to bring before this Commission, with regard to the viewpoint of the medical profession in relation to their lodge society practice. The only other matter I wish to state at this stage is that my friend was unable to indicate to me what doctors he proposed to call. At present I have only been able to make up my mind to call one, and that doctor has not a very large practice, though a distinguished man, and he practises in an industrial area.

Mr. Gain: That is not exactly right.

Mr. Dovey: You have told me the names of two.

Mr. Gain: We intend to call three.

Mr. Dovey: The man I will endeavour to call is not one of those three. With the permission of the Commission I shall call Mr. Thurkle.

Mr. Hubert Edward Thurkle, an officer of the Department of Health, Perth, was examined by Mr. Dovey. Mr. Thurkle stated that he was at present occupying the position of inspector of hospitals.

Mr. Thurkle described the position of the district medical officers at Broome, Derby, Port Hedland, Roebourne and Wyndham, as foreshadowed by Mr. Dovey in his opening. The fees charged under this system were discussed.

The Chairman: Upon that point, does it rest with the doctor to decide as to whether a fee is to be charged or not?

A.: Yes. In the general instructions that we issue to them, of which I will put in a copy, we leave it to the doctor largely to decide what fee he will charge. We give him a scale of charges to start off with.

Q.: You have got that scale, have not you?

A.: Yes. We finish up by saying that the above schedule applies to persons reasonably able to pay full fees, and then we go on to say that he may modify his charges according to the patient's ability to pay, so that we leave it to the doctor to decide the person's financial circumstances.

Q.: The fees are as follows: consultations, 10s. 6d.; inoculations and vaccinations, 10s. 6d. plus cost of material; anaesthetics, £1 1s. first half-hour, £2 2s. subsequently; workers' compensation cases, according to the British Medical Association schedule plus 33½% for north-west (I understand that there is a schedule in this State, just as in the other States, by agreement with the British Medical Association); tonsils and adenoids, £5 5s., including anaesthetic; circumcision, babies £1 1s., adults £3 3s.; curettage, £5 5s., if uncomplicated; minor surgical procedures, from £1 1s.; hernia, £15 15s. upwards, including anaesthetic; appendicectomy, £21 upwards, including anaesthetic; fractures and dislocations, according to workers' compensation schedule plus 50% (including anaesthetic); laparotomy, £21 upwards, including anaesthetic; midwifery (uncomplicated), £5 5s. to £7 7s. When a doctor has to travel outside the township limits to visit a patient, mileage shall be charged at the rate of 1s. per mile each way. That is to the patient, I suppose?

A.: Yes, if the patient can afford to pay.

Q.: The next provision is that all medicines supplied to patients shall be charged for at ordinary dispensary rates. Then follows what you have already said about modifying the charges?

A.: Yes.

Mr. Abrahams: Apparently the Western Australian Government thinks that the British Medical Association charges are low.

Mr. Dovey (to witness): You can answer that now, if you like?

A.: Those rates were drawn up by Dr. Atkinson, the Commissioner of Public Health, who decided the charges as a professional man.

Further evidence was given concerning this medical service and then the subsidized part-time district medical officers were discussed, and following that the position of certain subsidized medical officers.

Mr. Dovey: One sees on examination of that list that these officers receive some small subsidy which, I think, renders them obliged to treat the indigent sick in the hospital?

A.: Yes, it is given as a sum to recompense them for out-of-pocket expenses.

Q.: And the subsidy they get is for the purpose of meeting out-of-pocket expenses for attending the indigent in the hospital?

A.: Yes.

Q.: In addition to their obligation to attend indigents they also have a corresponding right to fully attend the private patients in these hospitals and charge for them as private patients?

A.: Yes.

The witness was next questioned concerning the hospital system which Mr. Dovey had outlined in his opening, and the general hospital organization throughout the State.

Mr. Dovey: In some centres there are medical funds which are conducted by the hospital board?

A.: Yes.

Q.: Will you shortly explain what that scheme is and how it is administered, and how the doctors are paid?

A.: Occasionally the scheme is a separate board, but in the majority of cases in the country it is a local hospital board. They start what they call a medical and hospital fund, the rates of subscription varying between 1s. 3d. and 2s. a week. That entitles the subscriber, his wife and dependants up to sixteen years of age to medical treatment, medicine and hospital attention. Now, out of that subscription the hospital board pays in the goldfields 35s. *per annum* to the doctor.

Q.: That is other than the Kalgoorlie goldfields?

A.: Yes, Kalgoorlie is not run by the hospitals at all. Where they run these separate funds they pay the doctor 35s. a year per subscriber in the timber area, 30s. mostly in other parts of the State.

Q.: The service given for these fees by the doctor is substantially the same service given by the medical practitioner on the friendly society basis?

A.: I am not quite sure, but usually the exemptions are that they are not entitled to benefits through alcoholism, venereal disease, maternity cases and operations of choice.

A statement prepared by Mr. Thurkle, showing the centres in which these funds are conducted by the hospital boards, the estimated number of members, the number of contributors and dependants, and the weekly rate of subscription, was tendered. This was discussed and other schemes for medical service were described by the witness, who gave evidence concerning the position in various country centres with respect to the provision of medical services. Estimates as to the proportion of dependants were given, and cross-examination took place thereon.

Statistics and figures with reference to various districts were discussed and the capacity of the public hospitals was also raised. After giving evidence on these matters the witness withdrew.

Mr. John William Tyson, a member of the Grand Council of Friendly Societies of Western Australia, and the Grand Secretary of the Independent Order of Oddfellows, was examined by Mr. Dovey.

Mr. Tyson stated that he had been associated with the friendly society movement for thirty-six years. He gave detailed evidence concerning the position of the friendly societies and the medical benefits provided by them in Western Australia. The position under the *Workers' Compensation Act* was discussed.

Mr. Dovey: Now, as a councillor, or personally as an officer of your lodge, are you in a position to tell this Royal Commission how you believe the introduction of national health insurance would affect the friendly societies in Western Australia, first of all as to whether many of your members are likely to drop out, and, if so, for what reason, and whether, on the other hand, you think it is likely you will have an increase in members, and if so, for what reason?

A.: You have to go a lot on supposition. Getting around amongst the members, I believe that we will lose a proportion of our present members. That is, quite a few of the single men will say that the national insurance benefit will be enough for them. On the other hand, we will retain quite a lot of our members, some of whom are not eligible for national insurance, and then, as regards quite a large number of our members, particularly in the mining areas, the incidence of sick pay is rather high, and it is quite possible that they will retain their membership; we feel sure that they will, because they will have the additional benefit. Personally, I am not a pessimist like some are, and I do not like to look at the matter from an inferiority angle; I do not think we will lose a great lot of our members in any case.

Q.: Do you think, on the other hand, it is likely that people who have hitherto not been members of lodges will be encouraged to join?

A.: During the last six months, when the campaign of national insurance has been so keen, and it has been so much talked about, our own membership seems to have taken a jump for the better—much better than during the last ten years.

Q.: Have you given any thought to the position which will arise in respect of many of your lodge members who, after national health insurance benefits commence, will receive their medical benefits through national health, and you will have to make some fresh arrangement with the doctors for service on their dependants? Has any consideration been given to what will happen then?

A.: What will happen is in the lap of the gods and this Commission, I think, but it has caused quite a lot of thought amongst our members. Naturally, most of our members who are now paying a standard rate of medical benefit fee for themselves, wives and families, are anticipating that when they have to pay a certain proportion through the National Insurance Commission, they will get benefits for their wives and families and will be able to provide medical benefits for them at a reduced rate compared with what they are paying now, including themselves. They are anticipating that.

Q.: But bearing in mind that at present the doctors have the benefit of a number of single men or unmarried persons with no dependants for the rate they get, and directing your attention to the fact that, under national health, provision will be made for dependants only, have you considered the possibility of having to pay something more—say two-thirds of the present rate—for medical benefit to the dependants?

A.: Any consideration which that has been given has only been by individuals. We are negotiating with the British Medical Association at present, and they are prepared to discuss matters with us, depending to a large extent upon the final figure of remuneration they will receive through the National Insurance Commission for those insured people.

Q.: I think the position in this State is that the representatives of the friendly societies and the British Medical Association have been cooperating to do the best they can for themselves and for each other, having in mind the advent to Perth of this Commission and the introduction of national health insurance. You have been working together harmoniously?

A.: Quite harmoniously.

The Chairman: Is it the position—I rather infer that it is—that until you get findings from us as to the amount of the capitation rate and such figures as we may recommend in connexion with dependants, your negotiations are in abeyance?

A.: That is exactly the position, and until those things are fixed, I understand we shall be going along under our existing agreement.

Mr. Tyson was cross-examined generally by Mr. Abrahams concerning the friendly society movement in Western Australia.

Mr. Abrahams: Have you formed any view, from your experience, as to the sickness which occurs among males and females respectively?

A.: The female sickness is undoubtedly higher. I mean they do not get the same high rate. The female sickness payments are not as high, and their periods are not so long, but their incidental sick pay is higher than the males.

Further cross-examination of Mr. Tyson related to certain figures as to friendly society membership and the dissection thereof into classes.

Mr. Abrahams: You expect to lose a certain number of single men when this national insurance scheme comes into operation?

A.: Yes, it is possible that we will.

Q.: You have indicated in your evidence in chief that you expect it?

A.: Yes.

Q.: Then there are some men who will be unable to continue, they won't be able to pay that 1s. 6d. per week for the national insurance and lodge dues for financial reasons?

A.: There may be some, but I combat that.

Q.: Well, I am asking you your opinion. You think that every member now belonging to a lodge will be able to stand up to both obligations?

A.: I think so.

Q.: Have you made inquiries?

A.: What kind of inquiries?

Q.: Have you made any?

A.: No, only by personal contact.

Q.: You have asked members?

A.: Yes.

Q.: How many?

A.: I suppose I have visited since this national insurance scheme has been in vogue perhaps 75% of my branches and discussed it with them.

After some further questioning Mr. Tyson withdrew. Mr. Thurkle was recalled to give some statistical evidence, and then Dr. Thomas Miles Gilbert, of Cue, was called as a witness by Mr. Abrahams and was examined by Mr. Gain.

Dr. Gilbert described Cue as a mining town situated between Mount Magnet and Meekatharra, about 528 miles north-east of Perth by rail, with an extremely hot and very dry climate.

Dr. Gilbert gave evidence of a confidential nature concerning his practice. He stated that travelling conditions in his district were very bad, describing the roads as "some of the worst in the State". He said that since charging a mileage fee he received very few calls, whereas when he commenced practice he had many. Most of his patients, he said, lived within a radius of twenty-five miles. He gave confidential details as to workers' compensation and certain medical funds and friendly societies, and then gave evidence concerning the prospective diminution in practice as a result of the introduction of national insurance. He was cross-examined by Mr. Dovey as to the manner in which he had arrived at his figures and generally upon confidential matters.

Dr. Martin Frank Williams, of Manjimup, was examined by Mr. Abrahams. He described Manjimup as a timber district, 190 miles inland, to the south of Perth, with a population of 3,000 in the town and surrounding districts served by him. Dr. Williams then gave evidence of a confidential nature concerning his practice and his replies to the questionnaire.

Mr. Abrahams: I understand that the position is that all timber workers in the three mills will become national insurance contributors by reason of their being manual workers?

A.: Yes.

Q.: What is your view about the position regarding excluded services; all these people are timber workers and will become insured under the national insurance scheme. At present you are rendering an all-in service?

A.: Yes.

Q.: I understand you have some view as to what will happen so far as excluded services are concerned when they become national insurance patients?

A.: They will probably have the same difficulty as we had in the days of the old agreement, that is, the difficulty in collecting fees.

Mr. Dovey: Is it not a term and condition of employment that the mill workers made these contributions?

A.: No, it is voluntary but customary. There are odd persons—I think about three or four—who do not belong to the fund for private reasons.

Mr. Abrahams: Another matter that concerns you is mileage?

A.: Yes.

Q.: You visit the mills one day a week and one mill two days?

A.: Yes.

Q.: And you have a small surgery in addition to your main surgery at Manjimup?

A.: That is so.

Q.: And you do not know at the moment whether the mileage will be measured from where those subsidiary surgeries are or whether from your main surgery in Manjimup?

A.: No.

Q.: If they are measured from the subsidiary surgeries you will get nothing for visiting those mills?

A.: That is so.

Q.: And they would have a right to call you out from Manjimup at any time?

A.: Yes.

After further evidence of a confidential nature, Dr. Williams was examined as to his estimate of loss of practice as a result of national insurance. He gave the figure of 26%.

The Commission adjourned at 4.32 p.m. until Thursday, October 20, 1938, at 10.30 a.m.

Thursday, October 20, 1938.

Dr. Williams was cross-examined by Mr. Dovey upon confidential matters.

Mr. Dovey: Are you obliged to keep a record of all cases reported to the board under the timber agreement?

A.: No.

Q.: At any rate, you do not do it?

A.: No. Under the timber agreement the position is that I agree to report to the board the patients treated, and the secretary agrees to supply me monthly with a list of members. There is a large amount of unnecessary work in it, and he tells me what members come on and go off, and I tell him anything he wants to know.

Q.: Neither side keeps strictly to the agreement?

A.: That is so.

Mr. Dovey: There is a clause 9 in the mines agreement which provides that the medical officer shall keep a record of all cases treated, and present a monthly report to the board. Exactly the same provision is to be found in the timber mill agreement, clause 12.

The Chairman: The extent of the actual figures would depend on what meaning is given to the word "report". He has to "report" to the board. That might be satisfied by his saying that so-and-so had typhoid fever.

The Witness: In practice the report is wanted by the committees of the funds to check their own books for patients for whom they have to pay hospital expenses. They want to know if the patients have been in hospital. If they are in any doubt about the patients, they ask me. Otherwise they take the hospital's report.

Mr. Dovey: The important words are that the medical officer shall report all cases. It has been suggested by some witnesses that that will be an insupportable burden.

The Chairman: Yes. We have not heard the last of that, but at the same time it may very well be that the amount of reporting that has to be done to satisfy that agreement will differ in amount and maybe in details.

Mr. Dovey: A record of all cases treated would, I think, be a clinical record.

The Chairman: Perhaps it is to check the financial side of the return; a clinical record would not be required probably.

Mr. Dovey: I do not think a complete clinical record would.

Dr. Mulvey: You have an inspector going round looking at your records from time to time?

Witness: No.

Q.: It is just left to your own discretion to keep the books as you think fit?

A.: Yes, the actual amount of recording and reporting is a minimum in amount.

Mr. Dovey: You do as little as you can?

A.: As little as will satisfy both of us. So long as a fund works all right, that is all that is necessary.

Mr. John Forrest, the Chairman of the Australian Aerial Medical Services, Western Australian Section, was called as a witness by Mr. Dovey and was examined by him. Mr. Forrest gave an account of the service maintained by his organization at Port Hedland.

Mr. Dovey: And as a result of these arrangements, I think it is a fact that this service ensures that every person within that very large area has the opportunity of securing medical attention almost immediately?

A.: I would not say almost immediately, but within a few hours. Also certain people might have to go a certain distance to one of these pedal sets in the outback area, and that might need some time; but twice daily they can speak to Port Hedland and speak to the doctor.

Dr. John Alexander Love, of Nedlands, a residential suburb of Perth, was examined by Mr. Gain. He gave evidence of a confidential nature concerning his practice. He estimated that his loss of practice under national health insurance would amount to 19%. He was cross-examined by Mr. Dovey and withdrew.

Dr. Henry David Phipps, of Wiluna, was examined by Mr. Gain. Wiluna was described as a mining and pastoral town, about 700 miles north-east of Perth by rail and 600 miles by road, with a population of about 6,500. Dr. Phipps stated that he served an area extending on the east for about 150 miles, on the north for about 50 miles, beyond which there was no habitation, on the south for about 120 miles and on the west for about 60 miles.

He gave confidential evidence as to his practice and his arrangements with the Wiluna Committee Subscription Fund. He gave an account of his experiences in visiting outlying patients and a description of travelling conditions generally, and mileage fees and the difficulty he experienced in securing payment for various long journeys.

The Chairman: On that state of things, apparently in your case, you might be better off even on the Insurance Commission's proposed scheme.

Mr. Gain: This witness would work it the same way as the doctor who gave evidence in Kalgoorlie.

The Chairman: I say that it might work out better in your case?

A.: Actually the position with these cases is that when you know the circumstances you often do not press for payment. On occasions I have not sent in a bill. For example, some time back I had a sick man on a station and he was in an extremely bad way. He had a sickness which meant he had to take his two children away from school, and I did two trips of eighty miles one way each time to see him, or, as a matter of fact, to bring him to hospital. I did not bill him because I knew his position. As a matter of fact he had owned a station at one time, but at that time he was only getting about 30s. a week and keep. He had been owner of the station worth £40,000 or £50,000.

Q.: Did the drought kill him?

A.: Yes, bad times. In those cases people are hard enough put to it to have to live in those parts, so it is very hard to have to make them pay more.

Q.: In such a case as yours it would not do to treat them as excluded services because you would not be able to get any money. You are better off under the proposed insurance scheme.

Mr. Gain: This witness would?

A.: Yes, in quite a lot of these travelling cases.

The Chairman: I am reminded that the position might very likely be this, that the Insurance Commission will not apply its medical provisions to that district at all, but cut it out altogether, and say they will not apply the medical services provisions of the Act to a particular district because of the difficulties arising.

Mr. Dovey: I had that possibility in mind. It seemed to me from the evidence we got yesterday from Mr. Thurlie and this morning that it would be of assistance to this Commission, and it is desirable to take the opportunity of having it because it must be of advantage to the National Health Insurance Commission.

The Chairman: It would be a guide to them, but it seems quite possible and quite probable indeed, that for some little time at any rate in these outlying districts the Insurance Commission will think it inadvisable to apply the medical services portion of the Act.

Dr. Phipps gave further evidence as to mileage and the generally difficult conditions, and was then cross-examined by Mr. Dovey. He stated that his practice was not subsidised in any way. After giving further evidence as to the conditions and amenities of practice in Wiluna the witness withdrew.

Dr. Frederick William Carter, of Leederville, a residential suburb of Perth, was examined by Mr. Abrahams. He gave confidential evidence concerning his practice.

Mr. Dovey: If one looks at these figures one finds that the income from the contract patients at any rate pays for the overhead, and everything else is then met.

The Chairman: It may; it does not matter. It pays for something. If it does not pay for the overhead it pays for part of his living.

Mr. Abrahams: It may well be that we will put a case to the Commission at a later stage. Assuming for the moment that four services a year is right and we are offered 2s. 9d. per service, we may well put a case, although I do not know yet if the evidence justifies it, that that does not cover the overhead. I do not know how far the evidence goes. That is the overhead referable to the general running of the practice.

The Chairman: You need not argue it now.

Mr. Abrahams: No. I am just indicating it so that it can be borne in mind by my friends.

The Chairman: So far as I am personally concerned it does not seem important that there is any special connexion or relationship between the contract practice and overhead. I do not see why in considering the capitation rate we should pay attention to any coincidence of any amount between overhead and lodge or contract rates. More important is the market price.

Mr. Abrahams: Yes, but public figures are available which indicate that costs per treatment of a patient at a hospital are a certain figure, well over 2s. per treatment. There are necessary costs in treating a patient if you have to run a house, telephone, car, maids and so on. Similarly, there are necessary costs of treating a patient in a hospital. If those costs should be in excess of 2s., say, and there are, say, four services, you can be up to 8s. immediately before the doctor gets 1d. for himself, and it may well be that in arriving at an appropriate figure (this is what will probably be submitted if the evidence justifies it) that that will be a foundation for the Commission's consideration later on, of what will be the true capitation fee. On the other hand, it may turn out to be quite unjustified by final evidence.

The Chairman: We will have to thrash it out later.

Dr. Carter gave evidence and read a statement prepared by him as to the rising consumption of medicines all over the world, especially with reference to the use of sedatives.

Mr. Abrahams: That means something like this, that whereas bromide acted as a sedative twenty years ago, today people are so inured to drugs that they require stronger sedatives than bromide to get the same effect?

A.: That is so.

Q.: More potency is required and a more potent sedative is needed to give the same effects?

A.: Yes. There is a very definite danger in overdoses of the more highly complex organic sedatives...

Q.: I was asking more of the effects and things you have seen. Take the shop-girl type of employee?

A.: My practice has been in a middle-class suburb and a great number of shop girls and people of that class have been largely patients of mine. I would say this definitely, that almost every girl of that class today carries some form of sedative or hypnotic in her handbag, aspirin is the commonest, but we have reason to believe that some of the more dangerous are in use. There is scarcely a house that you are called to where a sedative has not been taken before the doctor has been notified.

Q.: And what are those sedatives?

A.: Aspirin, phenacetin, antipyrine, amidopyrine.

Q.: Mr. Dovey seems to think that it is an exaggeration to say that every one of the girls has aspirin or something like it in her handbag. Have you had any experience?

A.: Well, I reiterate what I said, and that is that I believe almost every one does carry something of that kind in her handbag. I say again that you will find in almost every house that it is an exception not to find a bottle of aspirin on the mantelpiece or somewhere near to the bed in which the patient is placed. That patient has been given a sedative—of a harmless or more noxious type it does not matter—but nearly everyone is living this sedative life.

Dr. Carter was cross-examined by Mr. Dovey concerning his evidence as to the use of sedatives and the incidence of psychosomatic illnesses. Further cross-examination related to statistical matters.

Dr. J. A. Love was recalled and was further cross-examined by Mr. Dovey concerning the figures which he had supplied. Mr. Robert Lee Cadwallader, the accountant assisting Mr. Dovey, was examined on this matter conjointly with Dr. Love. This cross-examination, which was lengthy, related to confidential matters and to the manner in which figures supplied by the medical witnesses were being examined and checked by the accountants. Mr. Cadwallader stated that he had been unable to check the figures of Dr. Love or of Dr. Williams upon the data supplied to him.

Discussion then ensued on the figures supplied by the medical witnesses and the checking thereof by the accountants.

Mr. Abrahams: Mr. Cadwallader mentioned it, and it can be tested when I get back to Sydney. We are trying to get at the facts and put them before the Commission, and it is no use at this or any other stage for an accountant to say, "I cannot check the figures, I cannot say whether they are right or wrong". We know that months of work have been put in by the doctors trying to take these figures out. They are not records which are normally kept. The only records normally kept are clinical and financial records, and if my friend is going to suggest that there has been any inaccuracy, the proper way to do it is to say, "At page 473 of the evidence I cross-examined Dr. Smith, and he could not show that he rendered ten services on that day as he said".

Mr. Dovey: My friend is beating the air. As a matter of practice is that the accountants have seen these doctors, and, speaking broadly, they are in agreement as to whether the check can be made of the doctor's figures. If there has been any disagreement on any important matter, it has not been thought necessary to bring it to my notice. Mr. Cadwallader has come on the scene, and it does not seem to me to serve a useful purpose to keep witnesses in attendance for days till their evidence can be checked, and then to say in the presence of the witness who has been kept here at great expense, that the accountant says his figures cannot be checked. If there is any serious difficulty about the matter we will be told.

Mr. Cadwallader: We have found out one or two serious discrepancies and told Mr. Goddard about them.

Mr. Abrahams: It is no use my friend now or at any other stage saying that these figures could not be checked, and therefore that they are not to be relied upon.

Mr. Dovey: I am going to.

The Chairman: I think Mr. Dovey will be quite within his rights in ultimately saying this, and he is within his right while we are still in Perth to call attention to the suggested fact that the figures, for instance, as to the number of services rendered to lodge patients by a particular doctor cannot be checked by the account. They may be right or they may be wrong, but they cannot be checked, and he limits himself to that statement. He does not say they are inaccurate, but they cannot be checked, and therefore they are not so valuable as if they had been checked and found correct. And he is entitled to say that either now or ultimately, or at both times, and I am inclined to think it is only a fair thing as far as the Perth doctors are concerned to say it now while we are in Perth.

Mr. Abrahams: I cannot do any more on the evidence.

The Chairman: You are entitled, on the other hand, to say this, that even if the doctor's figures cannot be checked he has sworn to their correctness and has given his accounts. He has told how he arrived at them and has submitted himself to cross-examination upon them, and therefore you are asking the Commission to accept them as correct.

Mr. Abrahams: Yes, but I am rather concerned about my friend bringing it out now.

Mr. Dovey: There is nothing sinister in my bringing it out.

Mr. Abrahams: No, but if it is suggested there is anything more I can do to clarify the position, then I say there is nothing more.

The Chairman: I am inclined to think that is so. The nature of the case makes it practically impossible. Where books of a complete kind have not been kept, from the nature of the case it makes it practically impossible to submit them to a satisfactory check. That is the position you are in.

Sir George Allard: I think it is expecting too much to expect that you can get a detailed check or audit of the books for this purpose in all the circumstances. You can make some check, but I think it is expecting too much to make a detailed check and say, "These are absolutely correct".

Mr. Dovey: I agree, Sir George, one would not expect any doctor's books to be able to be a check for everything, but I am not offering any criticism with regard to the doctors' keeping their books.

Sir George Allard: These books have been kept in their ordinary way of business. They had not any knowledge this information would be wanted in detail, otherwise the books could have been kept and checked.

Mr. Dovey: That is so, in some cases. In the case of Dr. Love, however, the very book I directed the attention of the Commission to has been picked for this very purpose. That is why it only covered a certain period.

Sir George Allard: But they are not all like that.

Mr. Dovey: No. I do not dissent from one word you have uttered in that regard, but I submit my task is to examine the facts in order that I might ultimately be able to make a submission to the Commission on the weight that should be attached to the evidence, having regard to the fact whether the figures can or cannot be checked in some measure, either absolutely, or great or small.

Mr. Abrahams: There is one thing I can do, and that is that in regard to those doctors who are going to be called in Victoria and Tasmania, that my friend sends them to the accountant and does not let them go, and if he has anything to suggest as to the inaccuracy of the accounts the doctor can explain where he got the items from, rather than let him go away, and the accountant then say, "I could not check it".

Mr. Dovey: Very well. I will fall in with any suggestion of that sort. The course that has been followed up to date is the course that has been adopted to meet the convenience of the doctors, who are in all cases busy men, with many people looking to them for attention. If my friend wants them kept back or called again that can be done.

The Chairman: We will wait and see how that method pans out, and I have very little doubt that before very long we shall be all heartily sick of it.

Mr. Abrahams: Have you finished with Dr. Love?

The Chairman: My colleague Dr. Mulvey suggests a course which might be worth considering. Before the doctor is called at all, when he has made a statement of this kind he suggests that he interviews the accountants on both sides with all the books he has available, and the figures stated in his exhibit, and lets them question him as to how he arrives at the figures.

Mr. Dovey: I agree with that.

The Chairman: If necessary, he can then be put in the witness box, both accountants can report to their respective principals, and then the principals can examine accordingly. That is certainly much better than the other course, which would mean that a doctor would produce an exhibit of this kind, be examined in chief upon it in the way that has been customary—which I agree has nothing objectionable about it—and then be cross-examined. In cross-examining upon a matter of that kind, the cross-examination is necessarily of a fishing kind. The cross-examiner has to fish in dark waters; he has to grope—he does not know—and we will be hours and hours engaged in the groping process, trying to fish out something from the dark pond. We will never get to the end of it, so that rather than do that, let us adopt the course which Dr. Mulvey has suggested.

Mr. Abrahams: I agree with that.

Mr. Cadwallader: It will take some time to check these particulars before the doctor goes into the box. Quite a lot of our work has been done at night and during the week-end.

The Chairman: Either course apparently means a considerable amount of time, and I am afraid the medical witnesses will have to suffer that loss of time, either in the witness box under cross-examination or in the interviews with the accountants.

Mr. Abrahams: We will have to take a little more time before we start. Counsel will be ready, but I gather from Mr. Goddard that each doctor will take some hours.

The Chairman: We will not decide upon that now.

Mr. Abrahams: Mr. Goddard tells me that he takes a different view about Dr. Williams's records, which were very well kept.

Dr. Esmond Thomas Walsh, of Meekatharra, was examined by Mr. Gain. Meekatharra was stated to be a railway town, about 600 miles north-east of Perth by rail, being west of Wiluna, and having a population of about 2,000, including the surrounding district.

Dr. Walsh described the conditions in his area and then gave confidential evidence as to his practice. After cross-examination on these matters the witness withdrew.

The Commission adjourned at 4.28 p.m. until Friday, October 21, 1938, at 10.30 a.m.

Friday, October 21, 1938.

Dr. James Gordon Hislop, of St. George's Terrace, Perth, was examined by Mr. Abrahams. Dr. Hislop gave evidence as to the increase in psychoneurosis and the necessity for detailed and careful examination in such cases. He stated that there had been an enormous increase in the cost of drugs to the Perth Hospital. He emphasized the opportunity of the general practitioner to prevent the increase of psychoneurosis, and he doubted whether a practitioner under the national health insurance scheme would have, or would be allowed, the time necessary to deal properly with such cases. Dr. Hislop referred in detail to the position of diabetic patients and their medical advisers under national health insurance.

Mr. Abrahams: I am rather interested in this aspect of the inquiry, Your Honour. It is suggested, for instance, that a fixed fee of 20s. in Victoria in 1921 should be one to which the rigidity of the laws of the Medes and Persians should be applied, and because that has been accepted, and, it is suggested, without comment or complaint, in 1921, it should be applicable today. I am concerned with this type of evidence as showing that medical practice has altered; that new diseases have arisen, and particularly these psychosomatic complaints. That is the main purpose of the evidence. I am not suggesting that a general practitioner would spend the same time as a specialist in St. George's Terrace, but I am concerned to let the Commission see this new type of complaint, which must, of course, be dealt with in the first instance by the general practitioner.

Dr. Hislop was cross-examined by Mr. Dovey and then withdrew.

Dr. John Allan Roy Mitchell, of Perth, was called as a witness by Mr. Dovey and was examined by him. He was asked by Mr. Dovey, as a general practitioner with a lodge contract practice, to what he attributed the increase in psychoneurotic and psychosomatic complaints to which Dr. Hislop had referred. Dr. Mitchell said that he would rather say that there had been an increase of phobias, which he attributed to a large extent to the publicity given by the Press to cures and alleged cures of divers diseases.

Mr. Dovey: Have you anything to say on the subject of the taking of medicines; that is to say, medicines prescribed by the physician today as compared with twenty years ago?

A.: There is a definite tendency for the average patient to want additional treatment, but not to any great extent, I should imagine. I have not been conscious of that occurring in my practice in the last twenty years—not in the latter portion of it.

Q.: Has it been your experience that the young woman of today almost invariably carries in her handbag, or somewhere easily available, some form of sedative, such as aspirin or some other remedy?

A.: No, I have never seen anything of that nature; I have never observed it.

Q.: Have you seen any deterioration in the standard of health today compared with when you came to practise twenty years ago?

A.: Personally, I think that the young woman of today is a much better specimen in every shape and form than she was twenty years ago.

The Chairman: However, apart from that particular suggestion that they carry in their handbags these sedatives, what do you think about the suggestion that the use of sedatives has increased of late years?

A.: It has not come within my experience that it has to any alarming degree at all. I do not see it in my practice. Mine may be a particular kind of practice. I do not see many psychoneuroses, nor do I see many people that one would term drug addicts.

Q.: As far as you can observe, would your patients be people who would worry very much about the future of themselves or their children?

A.: I have never had occasion to regard it like that. I have never noticed that trend in them particularly, any more than any conscientious man would worry about the welfare of his wife and family.

Q.: Did they show signs of suffering from insomnia frequently?

A.: No, I should say rarely.

Dr. Mitchell then gave an account of conditions when he was in general practice in North Perth, and was cross-examined thereon by Mr. Abrahams.

Dr. Kenneth George McKay Aberdeen, of Northam, was examined by Mr. Abrahams. Northam is a town in a farming area with a population of 5,000, with an additional 2,000 in the surrounding districts. Dr. Aberdeen stated that he had made exhaustive inquiries to ascertain the number of people in the Northam district who would come under national health insurance. He detailed the sources from which he obtained his information, and after a comprehensive survey came to the conclusion that 1,800 out of the 7,000 people would become insurees, a percentage of 25.7. The estimate included all ages and sexes. Dr. Aberdeen stated that it was likely that he and his partners would get all those 1,800 insurees as panel patients.

Confidential evidence was then given as to Dr. Aberdeen's practice and that of his partners, indicating the amount of the loss that they expected to suffer. Dr. Aberdeen stated that he wished to give an account of certain special features relating to practice in country districts, on behalf of the Eastern Districts Medical Association, of which he was chairman.

Mr. Abrahams: I understand the first matter you wish to deal with is medical life, the shortening of medical life and the ill health of the country doctor. I do not want you to deal with that at great length?

A.: I wish to bring these matters forward to show the difficulty of country practice as compared with metropolitan, and therefore the claim for an increased capitation fee on that basis as between the two areas. In the country the worry and strain is greater, because of increased responsibility and there is less relaxation. Relaxation is liable to be interrupted at any time. A practitioner cannot hand over his work to a colleague, particularly in a single-man town where there is nobody to take over. Sunday is very often just like any other day; there is no let-up on it, and very often when he is off colour himself the medical man feels compelled to continue his work. For instance, with an attack of influenza, if he has really sick patients, he gets up and goes on. One of my colleagues recently in a town not far from us developed pneumonia, due to that reason entirely. Another had a nervous breakdown which cost him months away from his practice, for the same reason, that when he was ill he could not stop. On the question of hours, we cannot nominate fixed hours without causing a great deal of public inconvenience. The

people coming in from the farms very largely come in as the opportunity occurs, possibly when they can get a lift or so as not to interrupt the farm work, and if we insist on set hours we will cause a lot of public inconvenience, so that the medical man has to bear the inconvenience of seeing patients at any hours.

With regard to post-graduate work, it is very necessary for us to keep up our standard of work. We first of all have to get a locum, which is becoming increasingly difficult. We have to pay his expenses and keep him and his running expenses. Before the doctor goes away he has to pay his travelling fare, his keep while away, and for his course. He has three alternatives: he may take a trip abroad, which may mean from eight to twelve months and several hundred pounds; he may go east to the recognized post-graduate schools in Sydney or Melbourne, which entails £40 travelling fees, and we find a month away costs roughly £100. He may also go to the post-graduate course held in Perth one week each year. Unfortunately, it only lasts a week, and not many men from the country at one time can get away to attend it. I quote our own experience in Northam; myself and my team mates: one of our men did a post-graduate course four years ago. He went to England for a year and he has been to Melbourne twice in the last ten years, and every year one of the three of us comes down to this course at Perth. A second man has spent three months in Adelaide, another trip to Melbourne, and he comes down once a fortnight to Perth to work at the Perth Hospital, simply to work under a good man and improve his own work. On his holidays he works at Perth and he spends part of his time at Perth Hospital assisting. The third man has made nine post-graduate trips east in the last eighteen years, and makes frequent trips to Perth to see special work. The men in our district feel the need of this post-graduate work. The Eastern Districts Medical Association extends 300 miles from east to west, and 25 miles from north-west to south-east, and twice a year we hold a meeting for one day—on a Sunday, because that is the only day they can get away. On that day we have what is really a concentrated post-graduate course. In the morning we demonstrate newer methods at the hospital, lectures are given by Perth specialists or by eastern States specialists, modern methods in technique are shown by Perth men, if necessary, and the men discuss their mutual difficulties in work. To show how keen the men are, the average attendance over the last eight years has been 80% to 85%, and the average mileage travelled frequently exceeds 3,000 miles. The men come 150, 120, 110, 108 miles, and the attendance remains very high. A country man has to cover a greater range of service, because he cannot, like the city man, pass on his difficulties to specialists or into public hospitals.

Anæmias and typhoids in the working population are generally admitted to public hospitals, and so they pass out of the private practice, but the country man has to attend to those illnesses throughout. In complicated fractures, which are becoming increasingly common, because of increasing motor accidents, he has to look after those cases for months. He cannot pass them on. He has to be prepared at any time to do urgent operations, and as regards infectious diseases, the metropolitan areas all have isolation hospitals where those diseases go and are attended by residents. In the country the man has to attend to those himself. In the last two years at Northam we have attended 57 such cases, just to show that that is a considerable item.

Particularly in regard to bad fractures, I would like to point out that, to the country man, the exclusion of those from the list is not very important, because, when the bread winner is laid up for many months in hospital and is incapacitated afterwards, he becomes an indigent patient in any case. As regards laboratory work, it is done in the city by a specialist in a laboratory, or, as regards the poorer patients, at the public hospitals. Such tests as for blood diseases, kidney diseases, bladder diseases and so forth, which have to be frequently made in the interests of the patient, have to be done in the country when necessary by the doctor himself. They consume

much extra time compared with what they would in a good laboratory, and they mean extra equipment to meet the position.

In consultations, instead of having an ample range of consultants, the country man must make important decisions unaided; or else involve his patients in costly consulting trips: therefore, he has to have a wider range of books and instruments to enable him to meet those emergencies. It is not sufficiently realized that the more uncommon an emergency, the better has to be your equipment to meet it, because you are not trained by experience to deal with it well. You must have good equipment. The thing that you do frequently is different.

Mr. Dovey: You need to have better tools to do work with which you are not so familiar as work with which you are quite familiar; is that your point?

A.: Yes.

Mr. Abrahams: Take finance. You get ordinary fees when you have to do specialist's work in an emergency?

A.: Yes; you have to take the fees that are customary in the area.

Q.: Is it more difficult to obtain assistance—secretary, book-keeper and domestics—in the country?

A.: It is difficult to obtain efficient ones, and, when you do obtain them, they are more costly.

Q.: Then there is some experience you have of mining and agricultural towns in respect of instability of practice. Where a man walks out when wool or wheat drops in price and bad seasons come, the capital put into the practice in those cases disappears?

A.: Yes.

Mr. Dovey: Is that so, in agricultural districts, when there is a bad season?

A.: A series of bad seasons or a drop in wool or wheat.

Dr. Aberdeen gave certain examples of the loss of practices.

The Chairman: I do not think that this is of very great relevance as far as we are concerned. A doctor starts practice in a place which, because of the nature of the industries supporting that place, has a precarious existence. It may be that, when the foundation of the industry of the place vanishes, his practice vanishes, just in the same way as, if I may compare bad things with good, the liquor business in the place vanishes, and every other business in the place vanishes.

Mr. Abrahams: The doctor is making a comparison between the country man and the city man.

The Chairman: That is so, but is it a matter we can consider in fixing the capitation rate—not the capitation fee? I am afraid a good deal of this evidence is based upon the assumption that we have to fix differential capitation fees. I think, after consideration, you will find that what we are concerned with is the capitation rate which will make a fund or help to make a fund out of which the Insurance Commission will, it may be, if it thinks fit, make differential capitation fees.

Mr. Abrahams: I was under the impression, Your Honour . . .

The Chairman: I am only speaking now of my present feeling on the matter. Quite obviously, it may be, as a matter of fairness to the practitioners, there should be differing capitation fees. It may be that, in one country district the ground capitation fee for one should be X plus 1; for another country district, X plus 2, and so on, but the fixing of those differing capitation fees is a matter which only the Insurance Commission can effectively deal with. We cannot do it. We cannot measure the relative merit, in respect of the capitation fee, of one district as compared with another district.

Mr. Abrahams: I was under the impression, Your Honour, that one of the heads of reference covered this very matter.

The Chairman: I am inclined to think you will find that is not so.

Mr. Abrahams: I mean the one relating to how it should be apportioned.

The Chairman: It may be that, after consideration, we may think that we ought to do this. We may say that we think there should be differing capitation fees—that is to say, a higher capitation fee—for medical practitioners in remote country districts, higher than the capitation fee for urban districts. We may say that, and we may say that we have taken into consideration that aspect—that is to say, the justice or the injustice of fixing a higher rate for country districts than for urban districts—when fixing the capitation rate which will constitute the fund to be applied in that differing way. That is not the same as fixing differing capitation fees.

Mr. Abrahams: It is very relevant on that, but I was under the impression that one heading of the reference was, how is the fund so arrived at to be distributed?

The Chairman: I doubt it. I should not like to give a final opinion until I have studied it more closely, but my recollection is that it is very doubtful indeed whether that was contemplated, and you see the practical difficulties?

Mr. Abrahams: I see them. The difficulties would be enormous in fixing differing rates in the various places.

Mr. Dovey: Even if it be the fact that, under the terms of reference, what the Commission is asked to do is to fix the rate per insured person, nevertheless, in arriving at that rate, the Commission will have to form its own views, speaking generally, as to what is a fair capitation for, shall we say, practitioners in rural and non-rural districts.

The Chairman: It may be that we may think we can suggest that there should be some definite difference as between the urban capitation fee and the rural capitation fee, within certain broadly stated districts—something of that kind—but at present I am inclined to think, and I say no more, that the terms of reference do not require us to do that. What they require us to do is to state, generally speaking, the capitation rate.

Mr. Dovey: But all I was seeking to put is that the Commission will have in its own mind to say, "What do we think is a fair thing that the doctor in urban districts should get or the doctor in rural districts should get, in order to arrive at the rate . . ."

The Chairman: That is what I have already said. It may be that we may do something of this kind: We may say, "The urban capitation fee should be X. The rural capitation fee in some broadly defined districts should be X plus 1, and in another broadly defined rural district X plus 2, and that, having regard to those requirements—what we regard as fair requirements—the general capitation rate should be so much."

Further discussion ensued as to the differences between city and country and the disabilities and lack of amenities that were the lot of the country man. Dr. Aberdeen then criticized the proposed system as to mileage. Reference was made to migratory employees and what Dr. Aberdeen termed the "false migratory patient", the patient who changed his residence in order to get a change of doctors.

After discussing the question of certificates Dr. Aberdeen withdrew.

Mr. William Neilson Hancock, the Lay Secretary of the Perth Branch of the British Medical Association, was examined by Mr. Abrahams. Mr. Hancock gave evidence as to the collection and compilation of information with reference to lodge practices, mining fund members and other statistical matters. After cross-examination by Mr. Dovey he withdrew.

Dr. Ian Oriel Thorburn, of Victoria Park, was examined by Mr. Gain. He gave evidence with reference to certain questionnaires and documents. Dr. Thorburn was then examined concerning his experience of lodge practice and as to psychosomatic disorders, which he stated were in his opinion increasing.

That concluded the evidence to be called in Perth, and the Commission adjourned at 4 p.m. until Wednesday, October 26, 1938, at 2.30 p.m., at the Commonwealth offices, Melbourne.¹

¹The death of the British Medical Association's legal representatives has necessitated a longer adjournment. The Commission will meet next on Monday, November 14, 1938, at Hobart.

Correspondence.

NATIONAL HEALTH INSURANCE.

SIR: I was very pleased to see Dr. R. Errol Maffey's letter in your issue of October 15, on the subject of the financial eligibility of lodge members for medical benefits under the terms of the Common Form of Agreement.

I also have had occasion recently to point out to a prospective member that he should never have been sent to me, because he was honest enough to admit that his wages averaged more than £5 per week. The lodge secretary, when the matter was referred to him, stated that he thought the limit was £7 per week.

To my knowledge I have never had a new member bring a signed statement from a lodge secretary as to his eligibility for medical benefits, if passed by the doctor. I do not believe that lodge secretaries as a class make any effort to find out whether either new or old members are eligible for medical benefits. I have personal knowledge of one local member, an auctioneer, who wished to drop out of the lodge and come to me as a private patient, but the lodge secretary persuaded him not to do so, because he was the type of member they could ill afford to lose.

This merely shows that we cannot expect the lodge secretaries to safeguard our interests unless we insist on the terms of the agreement. By all means ask our Branch council to remind lodge secretaries of their duties in this regard, but also let the council urge all medical officers to friendly societies not to examine new members unless they bring with them the signed statement which the agreement stipulates.

The other matter raised by Dr. Maffey is also of great importance, whether or no national insurance is foisted onto us. I suppose every lodge doctor has on his lists members who are earning more than £364 *per annum*, although they have joined since 1914. Yet one hesitates to do anything about it, for various reasons. Firstly, there is the fear of challenging a particular member and finding oneself in the wrong. Secondly, there is the fear that such members, and perhaps other members also, will take exception to the doctor's just demands, and go to another doctor for the private treatment which they are forced to seek.

The position is this. While a doctor is new to a practice he does not care to antagonize any section of it, even though that section may not be directly remunerative. Once a doctor has become established he is used to things as they are and does not bother to insist on his rights under the agreement. My own lodge members include a number of responsible administrative officers in the town, as well as various independent tradesmen, storekeepers and farmers. Many of them demand private wards when they or their dependants require hospital treatment, and yet I hesitate to estrange them by personal challenge.

Perhaps our Branch council could take steps to remedy this position without making it a personal matter between each of us and his lodge members. Would it be possible to request the lodges officially to notify their secretaries that, say once a year, it will be necessary to get a statement from each member as to eligibility for medical benefits, and notify the doctor accordingly when next presenting his list?

One other matter needs attention at the same time. As I read the Common Form of Agreement, the list of members to be attended at lodge rates must be given to the doctor on the first day of the quarter (this means that members must be financial in advance), and payment for this list is to be made within fourteen days of the commencement of the quarter. The agreement is not absolutely clear on this point, but in practice at present I receive my list of members within the first fourteen days of the quarter if I am lucky, and payment is made for an amended list, with laggards added, in some cases before the end of the quarter, in other cases not until fourteen days after the commencement of the succeeding quarter. Surely this is not what the agreement means. It

means at present that I cannot know at the time of treatment of laggard members whether they have dropped out or not, and one does not know whether one is entitled to charge or not until next quarter.

I believe it would be in our interests if a definite statement could be made to the lodges on this matter at the same time as the other matters are dealt with. It has come to this, we must know in future who are our legitimate private patients.

Yours, etc.,

EDWARD S. STUCKEY.

Scone,
New South Wales,
October 14, 1938.

SIR: The time has arrived for very plain speaking in connexion with national health insurance. The majority of the profession realize that national health insurance is detrimental to them and to medicine as a science, but are loath to refuse to take panel patients because they may by so doing lose a considerable part of their practice, which will go to the other man. The part of the whole business that disappoints us is that those who have been appointed to official positions in the British Medical Association and are acting as our spokesmen are sadly lacking in firmness and are timid about taking the stand that we would like to see them take. It is the duty of the British Medical Association to let the National Health Insurance Commission and authorities know in no uncertain terms that the national health insurance proposals are distasteful to the profession and that the profession, or the bulk of it, wishes to have nothing to do with it under any terms. Until the British Medical Association summons sufficient courage to speak up the politician will override us.

Yours, etc.,

P. A. STEVENS.

Proserpine,
North Queensland,
October 15, 1938.

THE PRESENT POSITION OF SURGERY OF THE THYROID.

SIR: In "The Present Position of Surgery of the Thyroid" (THE MEDICAL JOURNAL OF AUSTRALIA, October 15, 1938), H. R. G. Poate says that "In toxic cases I view with great disfavour the relatively common procedure of a wedge resection from each lobe". Again he says: "It is far wiser to remove too much than too little gland substance . . ."

Of course the contribution was too brief for every minute detail to be mentioned, but as there is a sub-section "Operative Details", I looked closely to see how much thyroid tissue the author advocates removing in toxic cases. It is not stated explicitly, but I take it that he removes the whole of one lobe, the pyramidal lobe if present, and then: "I advise always freeing the upper pole on the opposite side as well . . ." I take it also that this means ligation and division of the superior thyroid vessels of the opposite side.

As the paper is a survey of the present position of thyroid surgery, it is permissible to quote from Robert S. Dinmore (*The Surgical Clinics of North America*, Volume XVII, Number 5, October, 1937, pages 1297 and 1301):

(a) After such a procedure [following a description of "technic" of "thyroidectomy"] a triangular piece of thyroid tissue thus remains in the tracheo-oesophageal groove . . . [on each side; a diagram is given of this on page 1296].

(b) . . . a satisfactory technic for thyroid surgery must preclude any injury to either the recurrent laryngeal nerves or to the parathyroid bodies . . .

And again:

. . . care being taken to leave as much of the posterior border of the thyroid as possible.

It is obvious that at the Cleveland Clinic the argument is all in favour of what is variously called "wedge resec-

tion", "melon-slice resection", and "subtotal thyroidectomy". The latter term is probably the more descriptive, and I think I am correct in saying that the technique was first sponsored in Empire countries by Dunhill.

In subtotal thyroidectomy four-fifths or a little more of the total thyroid tissue is removed, only the posterior borders of the lobes being left intact. This is the technique of choice, though one as yet not widely practised.

As to the argument that this so-called "melon-slice" resection affords greater protection to the recurrent laryngeal nerves, it is immaterial to the careful operator whether such is the case or otherwise. By working inside the adventitious capsule, dissecting cleanly, and using ligatures on carriers rather than clamps, the latter is extremely unlikely to injure nerves or parathyroids whatever type of resection he favours.

I hold the belief that the statement "I view with great disfavour the relatively common procedure of a wedge resection from each lobe" is worthy of qualification.

Yours, etc.,

141, Macquarie Street,
Sydney.
(Undated.)

W. MAXWELL.

Obituary.

FREDERICK THOMAS ALEXANDER LOVEGROVE.

WE are indebted to Dr. Cyril Bryan for the following account of the late Frederick Thomas Alexander Lovegrove.

The sudden death of Frederick Thomas Alexander Lovegrove on June 24, 1938, in Perth, cast a gloom over the whole of the medical profession in Western Australia. Dr. Lovegrove was universally admired and respected. He was the friend of every medical practitioner in the State, in his capacity as Government Medical Officer coming in contact with all of them at frequent intervals. Up to within a few hours of his death he was engaged in his ordinary duties, and his sudden end was a sharp shock to his family as well as to all his colleagues.

Lovegrove was born in England in 1875. He was educated at Merchant Taylors' School, Crosby, near Liverpool, and University College, Liverpool (then part of Victoria University), qualifying in 1898 as M.R.C.S., L.R.C.P. He later took his M.B., Ch.B. (Victoria). He held resident posts at the Children's Hospital and the Royal Infirmary, Liverpool, and was Holt Scholar in Anatomy at University College, Liverpool. For a period he served as a ship's surgeon, and then came out to Western Australia in 1900, where he had two uncles practising medicine, one of them being principal medical officer and commissioner of public health.

Lovegrove entered into practice at Perth and Yarloop; but in 1902 he returned to England. After travelling on the Continent for some time he went to sea again as ship's surgeon. Western Australia, however, called him back, and from 1906 he practised successively at Yarloop, Bremer Island and Tambellup, until the outbreak of the Great War. After four years' service, during which he attained the rank of lieutenant-colonel, he became, on his return to the State, the commanding officer of Number 8 Australian General Hospital at Fremantle. Resuming private practice, he resided at Tambellup and Dumbleyung, until in 1928 he was appointed Government Medical Officer in connexion with the State Insurance Department.

He is survived by Mrs. Lovegrove and four sons, one of whom, Dr. Tom Lovegrove, practises at Wongan Hills, Western Australia. The sympathy of the medical profession is extended to Mrs. Lovegrove and her family.

CHARLES HERBERT ESSERY LAWEES.

WE regret to announce the death of Dr. Charles Herbert Essery Lawes, which occurred on October 31, 1938, at Hornsby, New South Wales.

Books Received.

DIETS FOR DIABETES ARRANGED IN MENU FORM, by G. E. Beaumont, M.A., D.M., F.R.C.P., D.P.H.; 1933. London: J. and A. Churchill Limited. Large crown 8vo, pp. 49. Price: 2s. net.

BIOCHEMISTRY FOR MEDICAL STUDENTS, by W. V. Thorpe, M.A., Ph.D.; 1933. London: J. and A. Churchill Limited. Large crown 8vo, pp. 465, with illustrations. Price: 12s. 6d. net.

LEAGUE OF NATIONS PUBLICATIONS. QUARTERLY BULLETIN OF THE HEALTH ORGANIZATION; Volume VII. Numbers I, II and III; 1938. Geneva: League of Nations Publications Department; Australia: H. A. Goddard. Medium 8vo, pp. 607. Price: 2s. 6d. net each volume.

LEAGUE OF NATIONS PUBLICATIONS. CONVENTION FOR LIMITING THE MANUFACTURE AND REGULATING THE DISTRIBUTION OF NARCOTIC DRUGS OF JULY 13, 1931: HISTORICAL AND TECHNICAL STUDY, by the Opium Traffic Section of the Secretariat of the League of Nations; 1937. Geneva: League of Nations Publications Department; Australia: H. A. Goddard. Royal 8vo, pp. 338. Price: 9s. 6d. net.

CLINICS ON SECONDARY GASTRO-INTESTINAL DISORDERS: RECIPROCAL RELATIONSHIPS, by J. Friedenwald, M.D., T. H. Morrison, M.D., and S. Morrison, M.D.; 1933. London: Baillière, Tindall and Cox. Medium 8vo, pp. 262. Price: 13s. 6d. net.

Diary for the Month.

- Nov. 8.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 Nov. 9.—Victorian Branch, B.M.A.: Branch.
 Nov. 11.—Queensland Branch, B.M.A.: Council.
 Nov. 15.—New South Wales Branch, B.M.A.: Ethics Committee.
 Nov. 16.—Western Australian Branch, B.M.A.: Branch.
 Nov. 17.—New South Wales Branch, B.M.A.: Clinical Meeting.
 Nov. 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
 Nov. 23.—Victorian Branch, B.M.A.: Council.
 Nov. 24.—New South Wales Branch, B.M.A.: Branch.
 Nov. 24.—South Australian Branch, B.M.A.: Branch.
 Nov. 25.—Queensland Branch, B.M.A.: Council.
 Dec. 1.—Western Australian Branch, B.M.A.: Council.
 Dec. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.
 Dec. 6.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
 Dec. 7.—Victorian Branch, B.M.A.: Annual Meeting.
 Dec. 7.—South Australian Branch, B.M.A.: Council.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xviii to xx.

- ALFRED HOSPITAL, MELBOURNE, VICTORIA: The Marion and E. H. Flack Travelling Scholarship.
 AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Resident Medical Superintendent.
 CANTERBURY DISTRICT MEMORIAL HOSPITAL, CAMPSIE, NEW SOUTH WALES: Resident Medical Superintendent.
 CHILDREN'S HOSPITAL (INCORPORATED), PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.
 FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Junior Resident Medical Officer.
 INNISFAIR HOSPITALS BOARD, INNISFAIR, QUEENSLAND: Assistant Medical Officer.
 ROYAL HOBART HOSPITAL, HOBART, TASMANIA: Resident Medical Officer.
 ROYAL HOSPITAL FOR WOMEN, PADDINGTON, NEW SOUTH WALES: Resident Medical Officer, Junior Resident Medical Officer.
 THE LORD HOWE ISLAND BOARD OF CONTROL: Medical Officer.
 THE VICTORIAN EYE AND EAR HOSPITAL, MELBOURNE, VICTORIA: Assistant Honorary Aural Surgeon, Resident Surgeons.
 THE WOMEN'S HOSPITAL, CROWN STREET, SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officers.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmalm United Friendly Societies' Dispensary. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	Brisbane Associate Friendly Societies' Medical Institute. Prosperpine District Hospital. Members accepting LODGE* appointments and those desiring to accept appointments to any COUNTRY HOSPITAL are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
QUEENSLAND: Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17.	All Lodge appointments in South Australia. All contract Practice Appointments in South Australia.
SOUTH AUSTRALIAN: Secretary, 178, North Terrace, Adelaide.	WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.
	All Contract Practice Appointments in Western Australia.

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